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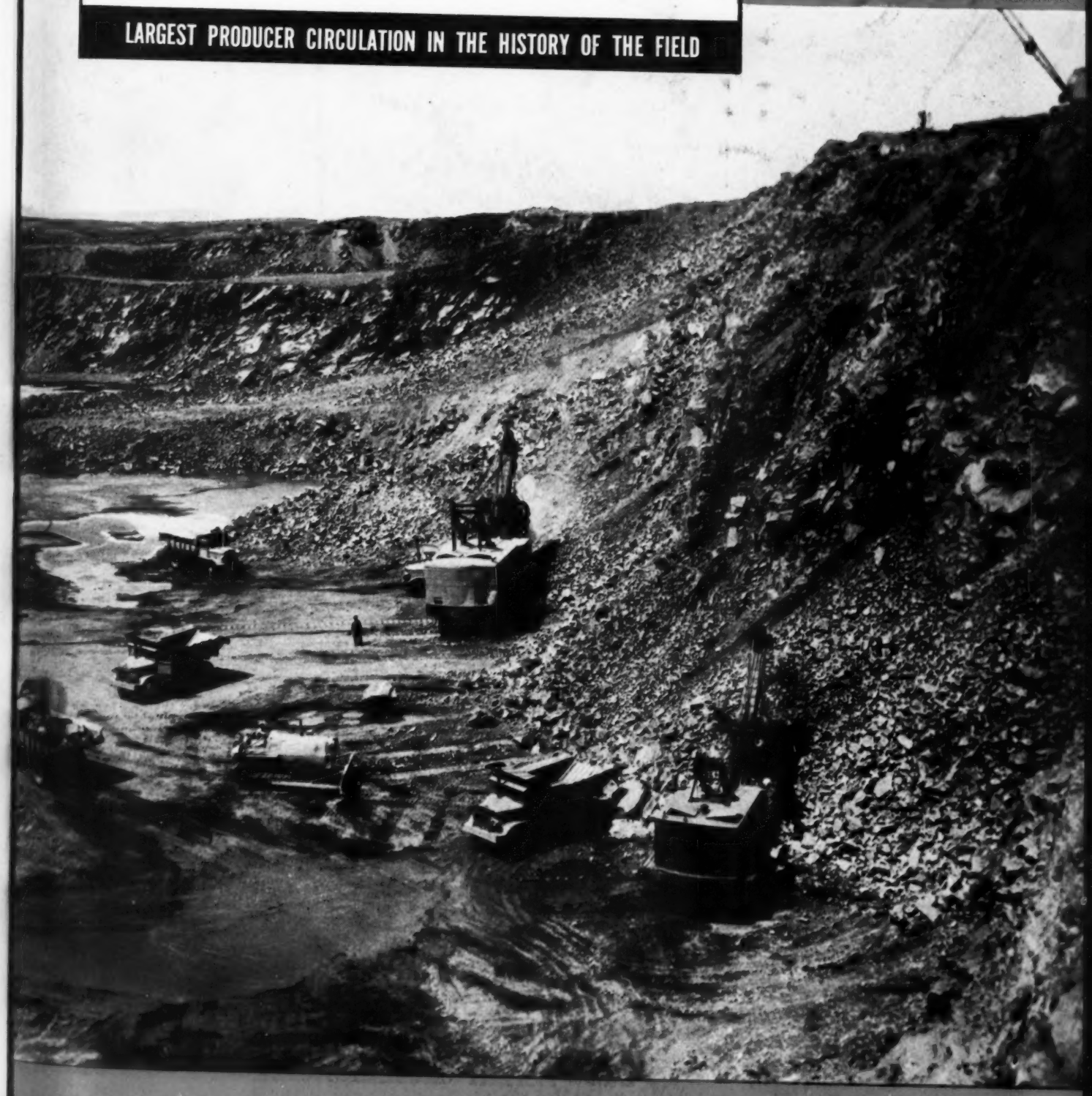
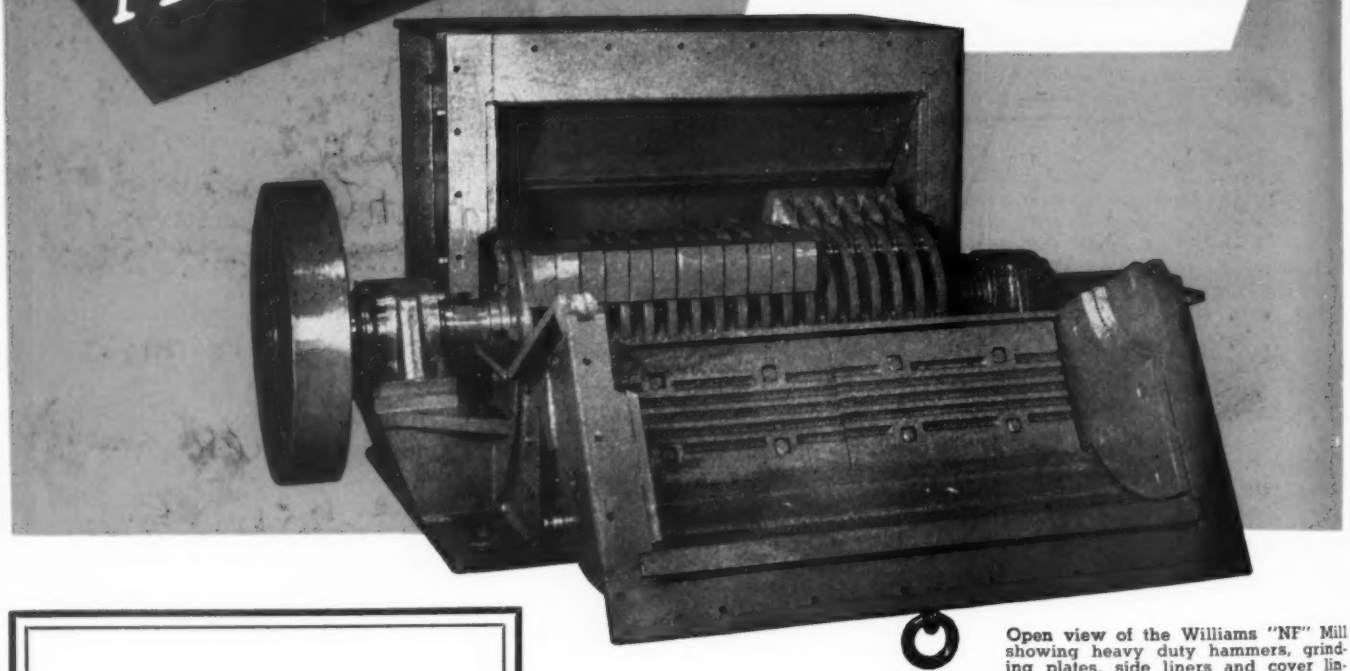


Quarry at Granite Canyon, Wyo., supplies million tons annually of ballast for Union Pacific

DESIGNED ESPECIALLY FOR AGSTONE

WILLIAMS "NF" HAMMER CRUSHER



Open view of the Williams "NF" Mill showing heavy duty hammers, grinding plates, side liners and cover liners. Also shows easy accessibility to mill for repairs, etc.

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- Adjustable grinding plate.
- Hammers adjustable to overcome wear.
- Larger capacities.
- Lifetime construction.
- 2" top liners, 1" side liners.
- Easy to work on —hinged cover.

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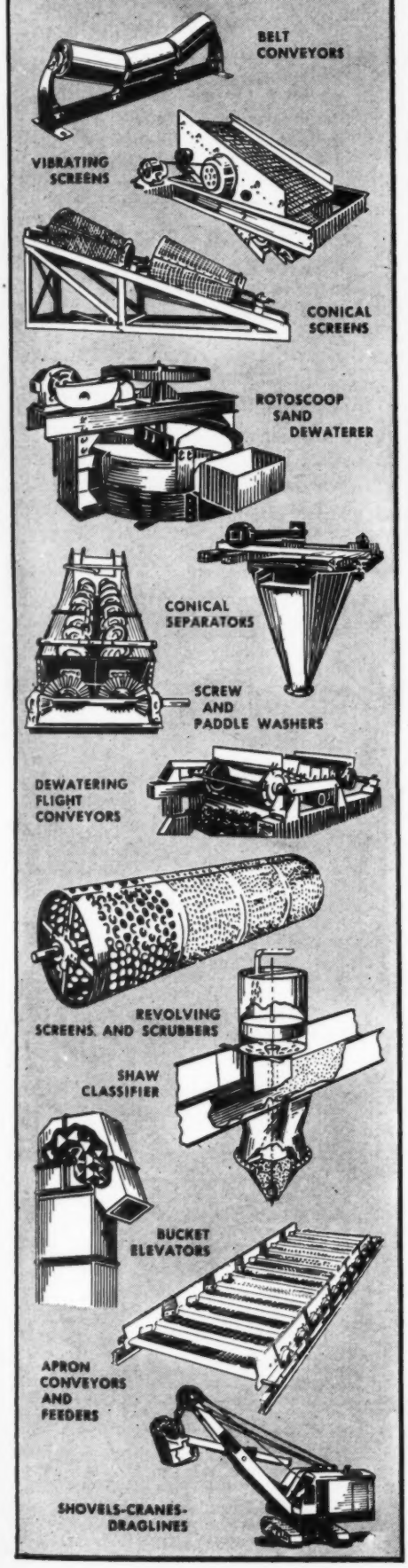

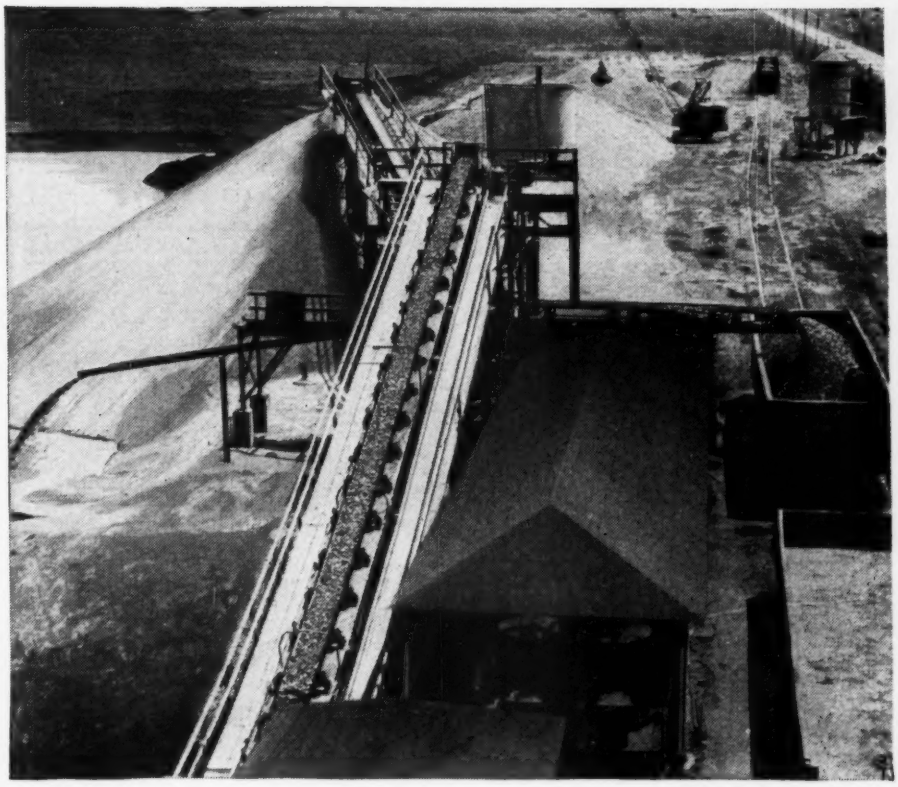

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NOVEMBER, 1948

ROCK PRODUCTS

THE INDUSTRY'S RECOGNIZED AUTHORITY

VOL. 51, No. 11

Ralph S. Torgerson
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"WE HEAR..."

November, 1948

A reduction in the price of steel is in the offing through development of a new short-cut procedure for obtaining semi-finished shapes. Officials predict savings of at least $3 per ton through use of the new process.

* * * * * * * * * * *

New construction in July was valued at $1,724,000,000, the highest monthly total on record, Department of Commerce has announced, bringing the value of new construction put in place during the first 7 months of the year to $9.4-billion, about 36 percent above the total for the comparable period of 1947. At this rate it seems that construction activity estimates of $18-billion for the calendar year 1948 will be realized. Private residential building continued to be the leading construction component in July, accounting for $667,000,000 of the total.

* * * * * * * * * * *

American business expects to pay out nearly $5-billion for new plants and equipment during the last three months of 1948, bringing the total for the year close to $19-billion.

* * * * * * * * * * *

Industrial accidents are most frequent in middle-sized plants. The industrial Safety Conference thinks factories with 100 to 500 workers have the most mishaps as they are too big for personal supervision and too small to afford a safety engineer. Last year, some 17,000 workers died, and 2,059,000 were injured in industrial mishaps. Losses to industry and labor came to well over $3.5-billion.

* * * * * * * * * * *

Construction contracts of all types in the 37 states east of the Rocky Mountains totaled $4,766,795,000 for the first six months of 1948, F. W. Dodge Corp. reports, setting a new record for any first half period. The previous high, set in the first half of 1946, was $3,937,736,000.

* * * * * * * * * * *

Powdered feldspar, or volcanic ash, is being used in the preparation of "super seeds," which seeds provide among other things, carrots that require no thinning and corn that can be sown two weeks early without being harmed by the cold. These super seeds are coated, making even microscopically small seeds big enough so they can be planted one at a time and spaced. The feldspar or ash adds bulk to the tiny seeds, and chemicals included in the coating make the plants grow faster and keep the seeds alive.

* * * * * * * * * * *

The contruction program in Alaska will amount to roughly $65,000,000 during the next year and a half and involves construction of housing, warehouses, barracks and other airfield appurtenances.

* * * * * * * * * * *

Volume of motor truck freight is greater than ever before and still on the increase. Volume in June was up 5.3 percent over the previous month, and 16.6 percent over June, 1947. In comparison with freight tonnage, Class I motor carriers have made greater proportional volume gains since 1939. Class I railroads carried 1.6-billion tons of freight in 1939 which increased to 3-billion tons at the height of the war, and stood at 2.9-billion tons last year. Class I motor carriers hauled 48-million tons in 1939, 114-million in 1943, and 134-million last year. According to the American Trucking Association, 10 percent of the nation's trucks are engaged in some phase of the construction industry.

WE HEAR

New variations of glass now being made can replace not only construction steel, but aluminum, brass, bronze and cast iron. In the non-metallic group they will substitute for cork, synthetic plastics, asbestos, rayon, rubber, cotton and linen. Glass experts are so optimistic about their new products they have suggested the use of glass variants instead of steel to reinforce concrete.

* * * * * * * * * * *

Shipments of finished steel for the first seven months of this year hit 37,486,000 tons, topping a year ago by 1,300,000 tons.

* * * * * * * * * * *

Indiscriminate drafting of engineers and scientists, as was practiced during World War II, will be avoided in any future draft through introduction of a more equitable system, states a letter from Selective Service Director Lewis B. Hershey to the National Society of Professional Engineers. The selective service system aim will be to place each individual so as "to serve best the national interest."

* * * * * * * * * * *

Southern construction contracts for the first six months of 1948 are valued at $1,382,278,000, a 59 percent increase over the figure for the first half of 1947, and the second highest total on record for a comparable period, Manufacturers Record reports.

* * * * * * * * * * *

Congress and the President have approved the appropriation of $573,242,-200 for Federal flood control and river and harbor work during 1949. Of this sum, $405,741,100 will be spent on flood control; $166,989,100 for rivers and harbors; $500,000 for alterations to bridges; and $12,000 for District of Columbia water mains.

* * * * * * * * * * *

Union cards now are carried by 16,100,000 workers. Labor unions, whose membership has been on an upward trend since 1933, when there was a total of 2,900,000 members, added more than a half million of the 16-million members since the Taft-Hartley Act became law.

* * * * * * * * * * *

Highway users paid at least $1,118,345,000 in emergency Federal automotive excise taxes during the fiscal year ended June 30, an all time high, and 14.6 percent above the previous year's collections. Included in the figures are the highway users' share of the Federal taxes on gasoline, lubricating oil, new cars, motorcycles and trucks, parts and accessories, and tires and tubes.

* * * * * * * * * * *

Housebuilding costs in Britain are up 225 percent over pre-war for a typical three bedroom home. Today's house also requires twice as much labor and one third more material. A house that cost $1250 in 1938-39 cost $4968 in the latter part of 1947.

* * * * * * * * * * *

Engineers estimate that highway construction needs in Oregon for the next ten years will cost $704,983,000, with $261,327,000 of the total being an immediate need. On the East Coast, some 22 highway projects in New York State, involving 82.37 miles of construction and estimated to cost $22,668,000, were announced recently.

* * * * * * * * * * *

Public construction will reach a new peacetime high this year. Department of Commerce estimates that about $4,150,000,000 will be spent by the federal government, states, cities and other public authorities in 1948 for new construction including hospitals, schools and highways.

* * * * * * * * * * *

Lack of skilled workers and slow-delivery or non-delivery of materials are given as the two biggest problems facing the U. S. construction industry today in a survey conducted by Engineering News-Record. Prices are third on the list of problems.

THE EDITORS

★ ★ Editor's Page

How to Get More Cement

WE HAVE had quite a few letters and telephone calls from readers appealing to the editors for assistance in obtaining portland cement, in order that they may continue to produce ready-mixed concrete or manufacture concrete products. As we all know, demand for cement over the nation is running well in excess of supply, to the extent that even large and extremely important construction projects are being delayed, so there is nothing tangible to offer in the way of solution to particular, individual emergencies as presented.

A good many of the appeals come from individuals and companies victimized by enforcement of the Federal Trade Commission's ruling that the basing point system of pricing cement is now illegal.

F.T.C. Effects

Those very few interests which lend support to the Supreme Court's decision upholding the F.T.C. would have us believe that hardship cases among purchasers would be offset by those benefiting from the new pricing practice but we do not subscribe to that. Scarcity resulting naturally from excess demand would not be as abrupt in its impact on relatively small users of cement that would follow the complete withdrawal of one or more large sources of supply from a consuming area. Artificial shortages superimposed upon natural deficiencies in given areas are unnecessarily putting out of business, temporarily at least, many small industries of the kind which the government supposedly intended to defend from alleged monopolistic practices. Some would survive if able to secure even part of their cement needs rather than none. Certainly, the housing shortage which is blamed on building interests has been further aggravated as a result. The Capehart Committee which is studying the effects of the F.T.C. ruling on business will be fortified with much evidence in the construction industries that many purchasers of cement have been put to unfair sales disadvantage because the price they pay for cement must be higher than that prevailing for competitors supplied from other mills.

Portland cement manufacturers, in quoting f.o.b. mill prices, are following the only safe course to guarantee compliance with the law. The decision to withdraw from long-established consuming centers did not come easy for those manufacturers who found it necessary to do so. Good will and successful business relationships were sacrificed in order to build customer acceptance in new marketing areas closer to point of manufacture. Geography is the determining competitive consideration today, and each mill must prepare to function within its own government-created monopoly.

Latest reports disclose that the portland cement industry will ship a record-breaking 205 to 210 million barrels of cement in 1948 which is said to represent full capacity. This "capacity" figure does not approach the 240 to 250 million barrel annual rated capacity for the industry which suggests that the higher figure might be approached through an analysis of reasons for the discrepancy. Substantial increases in productive capacity through plant building are unlikely at least through 1949.

Stretching the Supply

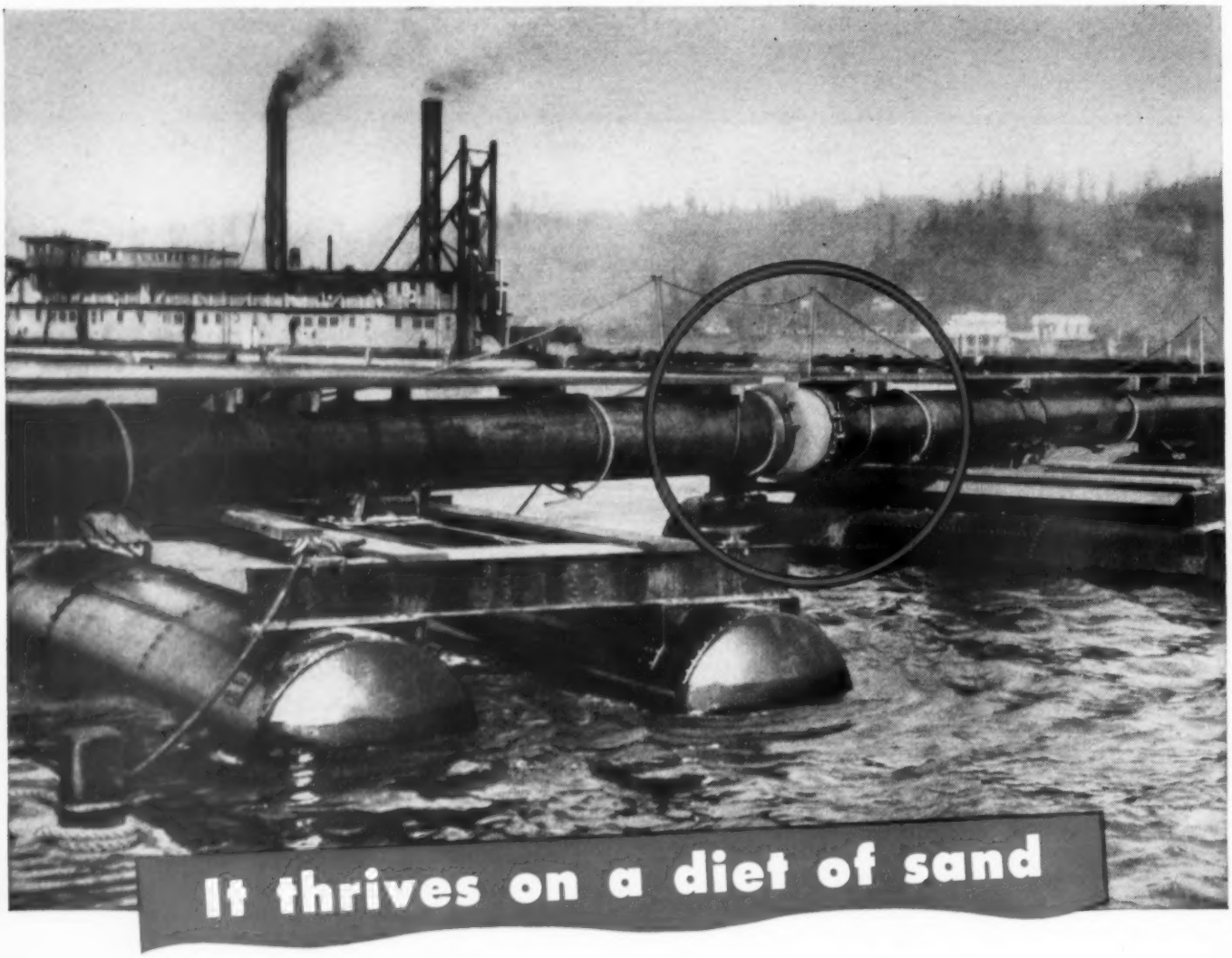
Standard portland cement was considered good enough for nearly all uses not so many years ago, and is the type that can be manufactured at the highest rate in any mill. Some mills have discontinued or decreased production of quick-setting cements which must be ground to higher than ordinary surface area at great sacrifice in capacity, and some other special cements as well, in their desire to increase production. Others have not done so because their customers often insist upon using type II cement or other types for applications where standard portland cement will serve the purpose well.

The practice whereby large users of cement require that special bins be set aside by cement manufacturers for "tested" cements exclusively for their own use is one that interferes with continuity of production through time lost in changeovers. That requirement has been prevalent and should be minimized. Most tested cements after all are regular mill run in the sense that the product in one bin set aside for a customer is the same as that in a second bin exclusively for similar use by another purchaser.

Some eight million barrels of cement are exported annually during seasons when plant silos are filled, and when the only other recourse would be enforced shutdown of operations. Much of that volume could be directed to domestic consumption if purchasers, separately or collectively, would provide their own storage facilities and purchase that cement in late Winter or early Spring.

We think that users of cement can do much to help the supply situation.

Bror Nordberg



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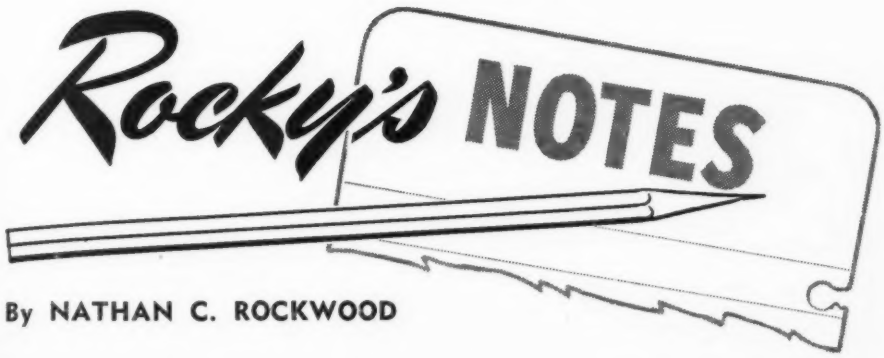


By NATHAN C. ROCKWOOD

Every Workman Becoming a Capitalist

IN A CASE before the United States Circuit Court of Appeals at Chicago, recently, three judges decided unanimously that union demands for inclusion of retirement, pension and general welfare schemes are proper subjects for collective bargaining negotiations, being included in the term "other conditions of employment."

Under this decision, the union or bargaining group can demand an agreement not only on the amount of the pension, but the age at which employes retire, the method of building the pension fund, its management, etc. These are points that hitherto have not reached an appeals court for decision, and the loser in this case, the Inland Steel Co., is carrying its case to the U. S. Supreme Court.

Vast Economic Importance

Our interest in the decision, and probably that of most readers, at this time anyway, is not in its legal aspects, but with its implications for the future of our economic system. We have already made some reference to this in our discussion of "Who Owns American Industry?", on this page in our issue of December, 1946; and events and developments since then have served to strengthen conclusions. Labor's interest in the establishment of such "security" plans has been increasing month by month; and as of July 1, 1948, according to the monthly *Labor Review* of the U. S. Department of Labor, more than 3,000,000 workers are covered by some type of health, welfare and/or retirement benefit plan under collective bargaining agreements.

The same authority says that current programs differ from earlier union or company welfare plans in that (1) they are part of the collective bargaining agreement; (2) are financed entirely or in large part by the employer; (3) the funds are union or jointly managed or administered; (4) benefits are generally more comprehensive in coverage and amount. Those that are voluntary usually depend upon contributions (or pay withholdings) on the part of the employe and equal or greater contributions by the employer. The funds to pay benefits may be administered by insurance companies, banks or trust companies, or trustees chosen by the employer, the employes, or both.

As a result of experience with both union and company welfare and insurance plans, a new profession has come into the field—employe benefit planning consultants. A recent issue of the *Chicago Journal of Commerce* included a special 20-pp. section devoted to a discussion of insurance and welfare plans, which contained the advertisements of 24 organizations specializing in preparing, administering and reviewing such plans. Regardless of how the benefit funds are accumulated and administered, they are directly or indirectly the capital of American industrial enterprises; and they will be "money in the bank" only so long as industry is prosperous and relatively stable. Even U. S. Government obligations are an indirect investment in American industry, and would become practically valueless were there no profits and income from productive enterprise with which taxes are paid, that in turn pay for interest and redemption.

Therefore, when employes and their unions insist on welfare, sickness and accident insurance, old-age pensions, etc., they are insisting at the same time on becoming capitalists. They must realize that such funds can be established and maintained on a sound productive basis, in a competitive economy, only at some sacrifice of present income. They can not have all the wages current traffic will bear, and expect that the trustees of their pension funds can at the same time save and invest for future benefit payments. Pension and welfare funds are the result of thrift; and since a majority of workers appear to prefer community thrift to individual thrift, they may still have to learn that the only way to obtain "security" is by the exercise of thrift somewhere in our social organization.

A Changing Economy

Lack of thrift as individuals, in spite of greatly increased wages, and the rapid growth of insurance funds designed for future "security" is changing our economy. Foremost is the fact that it is drying up sources of risk capital, with which nearly all new enterprises are started. Those with newly increased wages or incomes are not generally thrifty; and the previously thrifty ones with incomes of $10,000 or more are no longer able to be thrifty because of excessive income taxes. The result is that the only sources of risk capital left are the undistributed profits of enterprises, and if certain politicians have their way there won't be much of these. Anyhow, they are not available in the large amounts required for new industry today except to very large corporations. Hence, the little producer and manufacturer is being gradually squeezed out and practically prevented from engaging in anything new, without mortgaging what he has.

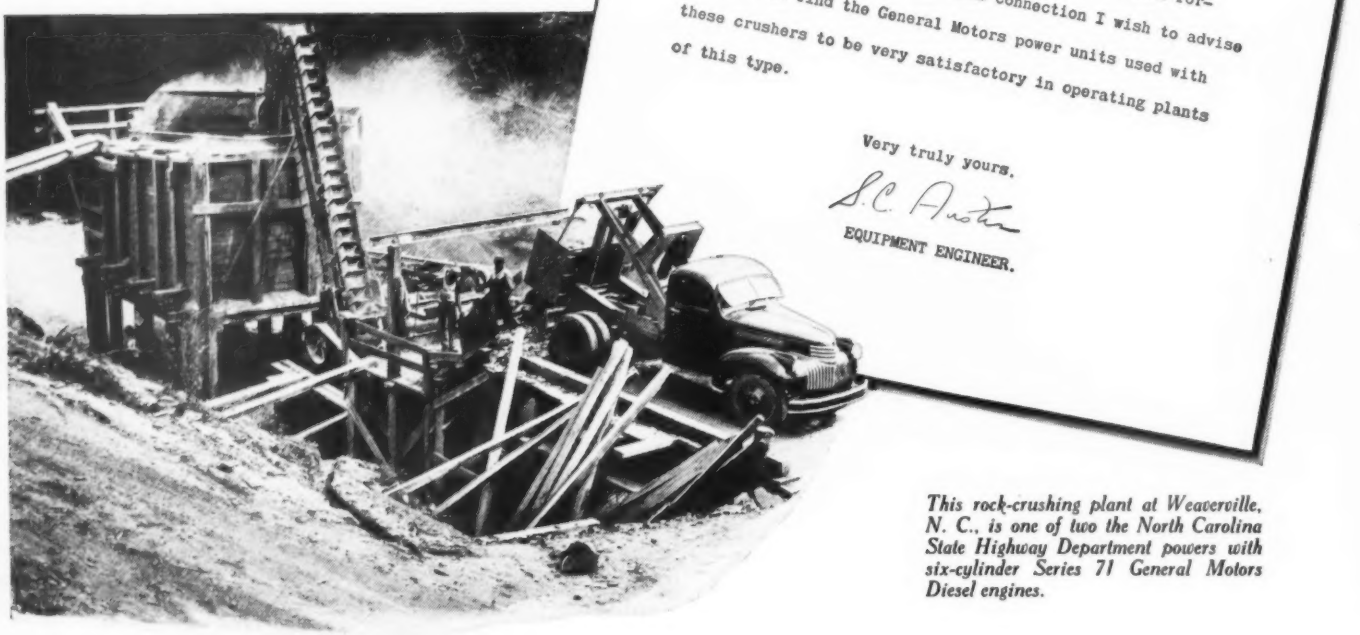
Need for Risk Capital

S. C. BADGER, financial secretary of the New England Mutual Life Insurance Co., told a recent gathering of life insurance company officers in Chicago that 40 percent of all corporate bond flotations during the first six months of 1948 had been placed privately with insurance companies and other managers of trust funds. By such private sales, the issuing corporation avoids registration with the Federal Securities Commission, the cost of which, involving so much "red tape," is almost prohibitive in the case of bond issues of $2,000,000 or less. He said "the enormous postwar supply of savings is mostly invested in government bonds, life insurance, savings banks and homes."

The situation of the insurance companies is such that they are in constant need of new investments in "sound" securities. These are necessarily largely in bonds and mortgages. They are being urged to make more investments in common and preferred stocks, not only to obtain a greater return, but to supply at least some of needed risk capital, without which our American system of competitive enterprise will stagnate. Unless someone assumes those risks the "sound" securities themselves may turn out to be not so sound.

The result may be all for the best in a complicated social organization, such as ours, if it succeeds in convincing the average citizen of his personal stake in profitable and stable industry and of his personal responsibility for efficient work in production. He may eventually learn that savings (capital) can not be supplied from either public or private sources without thrift, and that community thrift is only the sum total of individual thriftiness. Whether his share of the joint "social security" fund is invested in bonds, mortgages, U. S. Government securities, or what have you, they are nevertheless invested in the possibilities of success of a multitude of corporate and individual enterprises. When his demands as a worker or employe are such as to leave no possibility of profits, his future security will vanish along with his job. In this country at least he can't shirk his role as capitalist as well as worker.

Crushes 300 TONS A DAY...



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EQUIPMENT ENGINEER.

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Security of Management Rights

By NATHAN C. ROCKWOOD

SUPERINTENDENTS AND FOREMEN are usually practical men who learn their functions in the school of experience; and schools, books of rules and regulations, while sometimes helpful often do not leave the needed impression. There is, however, much to be learned from the experience of others in like situations, because then the human interest element is present. For that reason we think the following story of a case in the rock products industry will be useful to readers in avoiding similar difficulties. This concerns a familiar operation including the quarrying of dolomite for agricultural limestone and for the manufacture of sintered dolomite refractory used by the steel industry, and the location is in the Middle West. We won't name it because we do not wish to cause the operator or his employes any embarrassment, although it is all a matter of public record, if one knows where to look for it.

The facts in the case were these: John Doe was hired in May 1945 along with two other employes on what the company termed "a temporary basis." However, the contract with the union contained no provision for such "temporary employment," or any that the arbitrator who decided on the merits of the grievances thought could justify the company in hiring employes on a temporary basis, although the arbitrator did recognize the fact that all employes are on a temporary basis in that they may be laid off in the event of curtailed production. But, such layoffs must then be in accordance with the contract provisions on seniority.

Fired Without Just Cause?

When the three employes were put on the payroll, the superintendent instructed the foreman to keep an eye on them and report to him any failure to perform the jobs assigned to them. The superintendent explained to the arbitrator at the subsequent grievances hearing that he did this because he wanted to fire anyone or all of them who did not make good within "the 10-day probationary period," so that they would not acquire any seniority rights. The arbitrator said this explanation was based on a misconception of the contract, for there was no probationary period provided for in it, nor was there any evidence that the union had, "either expressly or impliedly" agreed to such a condition outside the contract. Hence, the arbitrator ruled, the three men had acquired seniority rights from the day they were hired, and all the provisions of the contract applied to them.

This particular grievance brought before the arbitrator by the union officials arose because, on the ninth day after John Doe was hired, the superintendent asked his foreman how the new men were doing. The foreman reported that he had passed Doe's work place eight times in the ensuing period after his employment, and that on four of these occasions he had found Doe sitting down and not working. The superintendent then had John Doe sent for, and fired him at the end of his shift.

Naturally, it seems to us, the arbitrator wanted to know if the foreman on any of the four occasions when he saw Doe not working he had told Doe to get to work or had given instructions as to what Doe was expected to be doing. Because, the arbitrator said, for all the foreman or the superintendent knew, Doe might have been waiting for tools or materials he may have sent for. This evidently caught the foreman flat-footed for he was unable to present any convincing evidence that he had made inquiry. So, it appeared to the arbitrator that the superintendent fired John Doe without asking for an explanation. He and the foreman probably just didn't like the guy, perhaps with reason.

However, we are living in a different kind of a world now, and this the superintendent and foreman found out to their chagrin, for the arbitrator, after explaining how the duties of the company and of the employes are reciprocal, ruled: "It was the foreman's duty to inquire of Doe what he was waiting for, and to put him to work. This he neglected to do, by the company's own admission, on all four occasions. Without a word of inquiry, caution, warning or reprimand, 'the axe fell.' If Doe had in fact been a probationary employe, perhaps he would have no remedy. But he was not. His discharge will therefore be set aside, with full compensation for all time lost." Now this decision was rendered August 10, 1948, and John Doe was fired May 21, 1945, so let the reader figure out the penalty for misinterpreting the contract, or for arbitrary action, or whatever other term appropriately applies. If you want to put new employes on a probationary period be sure such a provision is in your contract.

Reduction in Work Hours

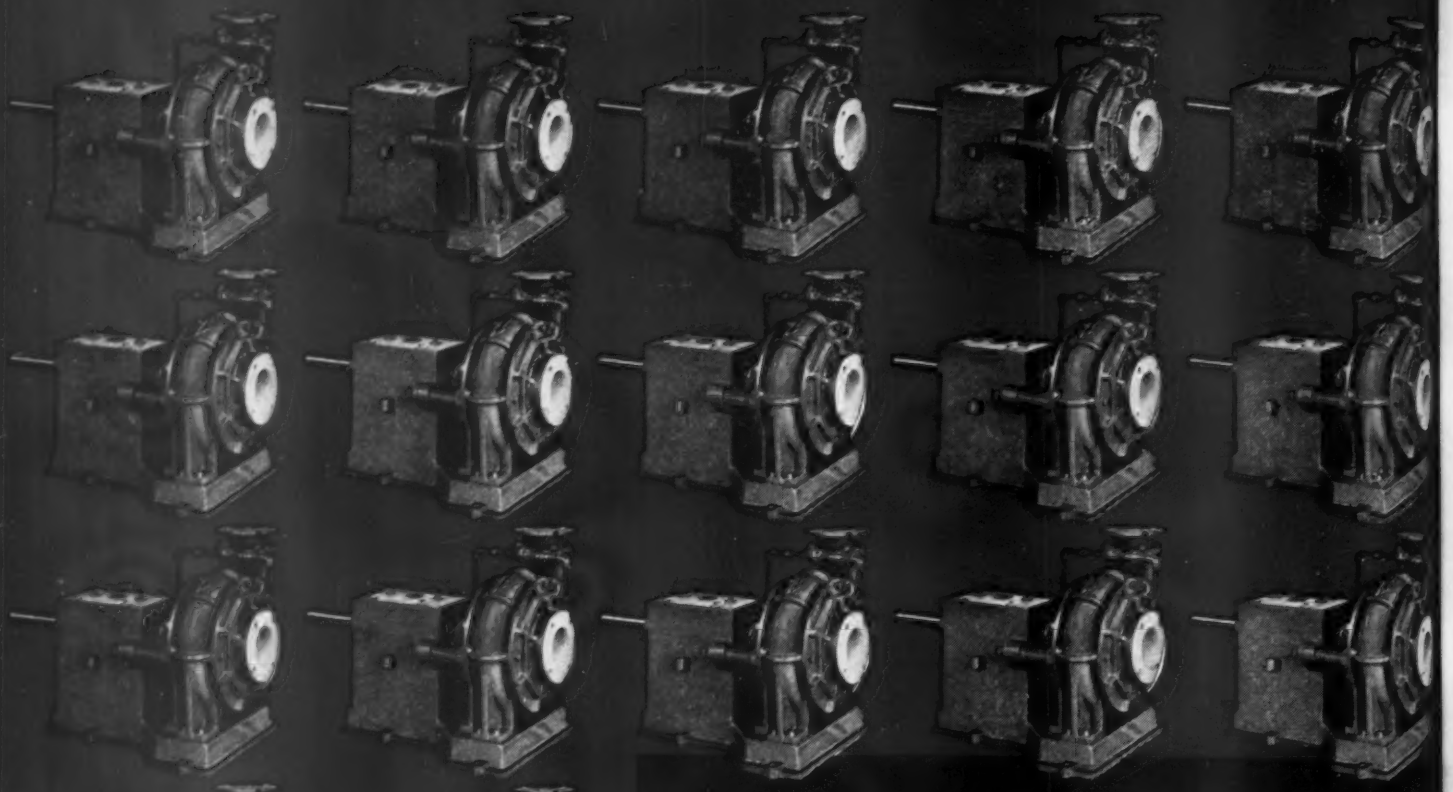
Another union grievance in the same hearing was that the company arbitrarily reduced the number of working hours of certain of its members. Like similar operations the plant was on a 7-day week basis, and by the terms of the contract the employes were guaranteed a 48-hour week, those who worked on Sunday being given a week day off. It was necessary to use two bulldozers cleaning up the quarry or stripping every day in the week, except that only one was operated on Sunday. The company had therefore arranged to give the two bulldozer operators 48 hours one week and 56 hours the next, alternately. In the Spring of this year the company management decided that it was not necessary to operate both bulldozers on Monday either, that one was sufficient.

Both bulldozer operators were accordingly placed on the same 48-hour a week schedule as other employes. But these men liked the extra 8-hour premium pay every two weeks, and their union protested that the employer had violated a provision of the contract which read: "All provisions and conditions must remain the same as at present except as hereinafter provided." The company, on the other hand, defended its action as an exercise of its managerial functions, secured to it in another provision of the contract which among other rights mentioned included: "the right to relieve employes from duty because of lack of work, or for proper cause."

The arbitrator said that a general "catch-all" provision, such as the first mentioned, designed to freeze general working conditions, cannot be construed to nullify an express provision of the contract, such as the second mentioned. He dismissed this grievance with the following explanation: "By rearranging its methods, the company effected an economy, and the employes were relieved of eight hours overtime, which they had been getting every two weeks. This was clearly an exercise of the right 'to relieve employes from duty because of lack of work.' The employes involved still get the 48 hours a week guaranteed in the contract; they have lost only an extra that the contract did not guarantee them. Had the parties intended to guarantee these few employes 56 hours a week, it would have been a simple matter to incorporate such a provision in the section guaranteeing all employes 48 hours a week. They did not do so, and it must be presumed they had no such intention."

The union argued further that this point was covered in a standard recognition clause in the contract, by which the company recognized the union as the sole collective bargaining agency for the employes "for the purpose of negotiating in respect to rates of pay, hours of employment and working conditions." However, the arbitrator said there was no application of this provision since the management had not violated it, had not recognized any other agency for bargaining purposes, but on the contrary had just completed negotiating a new contract with the same union. He ruled: "The recognition clause could not be so construed as to deprive the company of its right to manage the plant, to effect

(Continued on page 108)



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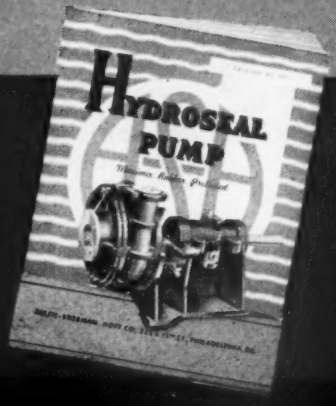

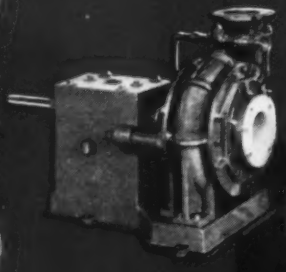

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the *Personal Side* of the news

Assists District Manager

CARL H. SCHLUTOW, sales representative for the central-eastern Illinois territory of the Alpha Portland Cement Co., Easton, Penn., has been

Carl H. Schlutow

promoted to assistant district manager at St. Louis, Mo. Mr. Schlutow started his career in the cement industry with the Missouri Portland Cement Company and served in various capacities. During the last seven years he has been engaged in the sales end of the business. He became associated with Alpha Portland Cement Company in March, 1947.

General Superintendent

WILLIAM D. GARVIN has been named general superintendent of all plants of the Standard Lime and Stone Co., Baltimore, Md., working directly under Daniel Baker, Jr., president in charge of operations. Mr. Garvin was formerly assistant to the general superintendent and vice-president of operations, Frank C. Thomas, who was killed recently in an airplane crash while on a trip to one of the company's operations in Virginia. LOUIS J. MUELLER, superintendent of the Martinsburg, W. Va., plant, has been appointed assistant general superintendent. THOMAS A. CHERRY, who has been with the company for over 50 years, has been made assistant general superintendent with headquarters at the Millville, W. Va., plant. PAUL P. SPECHT, formerly budget director under Mr. Thomas, has been named administrative assistant to the general superintendent.

Secretary Resigns

A. B. PARSONS has resigned as secretary of the American Institute of Mining and Metallurgical Engineers, New York, N. Y. His resignation becomes effective in February, 1949, but in the meantime he is to be on leave of absence. Mr. Parsons concludes 19 years' association with the A.I.M.E., serving 18 of them as secretary. At his suggestion, E. H. ROBIE, who has been his principal assistant, will be acting secretary.

Joins P.C.A.

FRANCIS H. MILLER, former assistant engineer for Sandusky County, Ohio, has been appointed field representative for the Portland Cement Association in Marion, Morrow, Union, Delaware, Madison, Franklin, Fayette, Pickaway, Ross, Highland, Brown, Adams, Scioto, Jackson, Lawrence, Hocking, Vinton, Gallia, Meigs, Athens, Morgan, Washington, Noble and Monroe counties in Ohio.

To Retire

GEORGE SCHWAAB, sales manager of the Manitowoc Portland Cement Co., Manitowoc, Wis., is planning to retire from the company in December of this year, to operate a citrus grove near Pharr, Texas. Mr. Schwaab joined the sales staff at Indianapolis in 1917 and was made sales manager at Manitowoc. He moved to Milwaukee in 1947 when the sales office was transferred there.

Named Director

H. F. GARVIN PELSUE, president of the Metrolpolitan Sand and Gravel Corp., Port Washington, N. Y., has been elected a director of The Callanan Road Improvement Co., South Bethlehem, N. Y. WILBUR C. KLEINHANS, who has been associated with the company since 1916, has been named treasurer.

H. F. Garvin Pelsue

Retires

WINFIELD H. MCDOWELL, sales manager for the Kansas City, Mo., territory of Universal Atlas Cement Co., New York, N. Y., has retired after 37 years of service with the company. HAROLD J. LAYDEN, formerly St. Louis district sales manager, has been appointed to succeed Mr. McDowell. W. TROY GAUNT has been named to succeed Mr. Layden at St. Louis.

Mr. McDowell is a graduate of Pennsylvania State College where he received his B.S. degree in mining engineering. He worked in various engineering capacities for six years and joined Universal Atlas Cement Co. in 1911 as salesman at the Pittsburgh office. In 1919, he became correspondent at Pittsburgh and eight years later was appointed sales agent at Cleveland. In 1928, he was advanced to division sales manager at Pittsburgh, and five years later was promoted to assistant sales manager. In 1934, he was made sales manager at Kansas City.

Mr. Layden graduated from St. Ambrose College, Davenport, Iowa, in 1917, and joined Universal Atlas in 1926 as salesman at the Chicago office. In 1935, he was transferred to Kansas City, and five years later started as salesman at the St. Louis office, subsequently becoming district sales manager.

Mr. Gaunt joined the company in 1924 and during the ensuing 24 years has been active in sales work throughout Kansas, Missouri, Arkansas, Kentucky, Louisiana, Texas and Oklahoma, as assistant sales manager and district sales manager.

Named Assistant General Superintendent

WILLIAM R. WEBB, production superintendent of the Blair quarries of Jones and Laughlin Steel Corp. in West Virginia, has been appointed assistant general superintendent at the company's Benson iron mine at Star Lake, N. Y.

Goes to Mexico

FREMONT E. WOOD, chief engineer for the Western Gypsum Co., Sigurd, Utah, has resigned to accept a position as mechanical electrical superintendent for the American Smelting and Refining Co., Parral, Chihuahua, Mexico. Prior to joining the gypsum company, Mr. Wood was chief engineer for the California Institute of Technology, Inyokern, Calif.

Sales Manager

ALVIN W. HICKS, service engineer in the Memphis office of the Marquette Cement Manufacturing Co., Chicago, Ill., has been appointed sales manager

Alvin W. Hicks

in the St. Louis office. He will have charge of sales in Missouri, southern Illinois and southern Indiana. Mr. Hicks is a concrete specialist of wide experience. He received his engineering training at the University of Texas and subsequently was employed in the engineering divisions of the Missouri Pacific Railroad, Arkansas State Highway Department, and U. S. Engineers.

Association President

DR. RUSSELL COLEMAN, director of the Mississippi Agricultural Experiment Station, has been named president of the National Fertilizer Association. He succeeds Maurice H. Lockwood who has resigned to become a vice-president of the International Minerals and Chemical Corp., Chicago, Ill.

Heads Stone Operations

R. J. ANDREWS of Toledo, Ohio, has been placed in charge of all operations of the France Stone Co. in North Baltimore, Ohio, including the quarry, boiler shop and machine shop. R. R. FOLEY, superintendent of the quarry, has been transferred to an engineering position at Toledo.

Heads Section of Bureau of Standards

H. F. MCMURDIE, authority in the field of microstructure, has been appointed chief of the constitution and microstructure section of the mineral products division of the National Bureau of Standards, Washington, D. C. He has been a member of the staff since 1928, serving at the materials testing laboratory in Riverside, Calif., until 1933. In 1935 he returned to the Bureau as a petrographer, and for the past 13 years has been engaged in studies of the constitution and microstructure of nonmetallic mineral products. He is author of numerous papers dealing with X-ray studies of ceramic materials, phase equilibria in portland cement clinker, and microscopic investigation of clay minerals.

Chief Chemist Promoted

CHARLES H. DICKENS, chief chemist and inspector at the Waco, Texas, plant of the Universal Atlas Cement Co., New York, N. Y., has been appointed assistant plant manager. HARRY W. HUNT, assistant chief chemist, will succeed Mr. Dickens as chief chemist and inspector. Mr. Dickens joined the company in 1922 at the Independence, Kansas, plant, serving as laboratory assistant and assistant chemist until April, 1929, when he was transferred to the Waco plant as chief chemist. Mr. Hunt has been at the Waco plant for 22 years, beginning as a laborer in 1928, becoming analyst in 1940 and assistant chief chemist in 1947.

Receives Award

ROY W. CRUM, director of the Highway Research Board, has been awarded the Marston Medal for 1948 by Iowa State College. This honorary award, which was established in 1938 by Anson Marston, is bestowed annually on an engineering alumnus in recognition of engineering achievement. Mr. Crum received his B.S. degree in 1907 and his professional degree in civil engineering in 1914. He is a member of the American Society for Testing Materials, American Concrete Institute, and American Society of Civil Engineers' board of direction. Mr. Crum joined the Highway Research Board in 1928, and has been a speaker at conventions serving the rock products industry.

Toastmaster

JOSEPH L. SHIELY, SR., president of J. L. Shiely Co., Inc., St. Paul, Minn., was toastmaster and speaker of the banquet at the annual Fall Stag of the Minnesota Surveyors' and Engineers' Society, which was held at Breezy Point Lodge, Pelican Lake, Minn., September 16 and 17. For fun and relaxation there was golf, trapshooting, soft ball, horseshoe, shuffleboard, fishing, swimming, cribbage, pasteboard games, eating and refreshments.

Named Superintendent

WALTER A. STINSON has been appointed superintendent of the U. S. Lime Products Corp., Sonora, Calif.

Heads Talc Firm

R. T. VANDERBILT of New York, N. Y., has been elected president of the new Gouverneur Talc Co., Inc., Gouverneur, New York. F. B. VANDERBILT has been named secretary, and F. C. GENNS, treasurer. ROBERT S. MCCLELLAN of Hailesboro, N. Y., will be vice-president and general manager.

Honorary Members

SAMUEL HOBBS, engineer in the Los Angeles, Calif., office of the Portland Cement Association, Chicago, Ill., and ALBYN MACKINTOSH, consulting engineer in Los Angeles, have been named honorary members of the Concrete Masonry Manufacturers Association of Southern California.

Sales Manager

ROBERT TAYLOR, formerly vice-president and sales manager of The Diamond Portland Cement Co., Middle Branch, Ohio, has been appointed manager of the wholesale sales department of the J. P. Loomis Coal and Supply Co., Akron, Ohio.

Resigns

A. A. NILSEN, ore beneficiation engineer, ore mines and quarries, for the Tennessee Coal, Iron and Railroad Co., Birmingham, Ala., has resigned to accept a position as engineer with the American Ore Reclamation Co., Chicago, Ill.

Work for Community Chest

ROBERT B. LENHART of Gravel Products Corp., Buffalo, N. Y., and CARLETON J. LEWIS, assistant secretary of the Buffalo Gravel Corp., have been appointed to serve as majors in the 1948 Buffalo Community Chest Campaign.

Chief Engineer

J. F. HAVARD, works manager at the Midland, Calif., plant of the United States Gypsum Co., Chicago, Ill., has been appointed chief engineer of mines with headquarters in Chicago.

Elected President

J. Z. HOLLMAN, manager of the insulating materials division of The Flintkote Co., East Rutherford, N. J., has been elected president of the National Mineral Wool Association, New York, N. Y.

Safety Director

ROBERT S. REYNOLDS has been appointed safety director of the Glens Falls Portland Cement Co., Glens Falls, N. Y., in addition to his duties as head of personnel and employment.

Named Vice-Presidents

EDWIN COX and C. E. HEINRICHS have been named vice-presidents of the Virginia-Carolina Chemical Corp., Richmond, Va.

Purchasing Agent

H. D. KIMBALL has been appointed purchasing agent of Permanente Cement Co., Diamond Division, Seattle, Wash. MRS. RUSSELL MONETTE will be his assistant.

Construction Engineer

GEORGE D. DIES has been appointed construction engineer for the Canada Cement Co., Belleville, Ont., Canada.

OBITUARIES

DAVID HARRIS ARRICK, founder of the Wells Pit Sand Co., Proctor, W. Va., passed away September 15. He was 63 years of age.

MISS BEULAH M. DAVIES, who for many years served on the staff of A. T. Goldbeck, engineering director of the National Crushed Stone Association, Washington, D. C., died September 17 after a long illness. Miss Davies resided with Mr. and Mrs. Goldbeck in Chevy Chase, Md., and is survived by her sister, Mrs. Goldbeck, four other sisters and four brothers.

CAPT. HERBERT C. WHITEHURST, director of the District of Columbia Highway Department, died September 1 of a heart attack. He had just returned from a vacation near Irvington, Va. Capt. Whitehurst was also treasurer of the American Road Builders' Association, Washington, D. C. He was president in 1935-36 and the first president of the municipal division.

Asbestos Supply Increase

SUPPLY of asbestos cement building products, heavily demanded for postwar construction, should be somewhat greater this year if mining of raw asbestos continues the upward trend it showed in 1947, Asbestos Cement Products Association, reports. Last year both imports and domestic output of asbestos were greater than in 1946. Imports totaled nearly 595,000 tons, compared with 456,000 tons the previous year, representing 96 percent of all asbestos used in the United States during the year. Domestic production reached a record 25,000 tons, 74 percent more than the 14,400 tons mined in 1946.

Limit Effectiveness of Rock Dust in Mines

EVIDENCE showing limits to the ability of rock dust to confine coal mine explosions was presented recently in a paper prepared by the Bureau of Mines. The paper said tests conducted in the bureau's experimental mine indicate bag type rock dust protective devices not effective in preventing spread of explosions from connected rooms or from rooms into entries. While rock dusting to within 80 ft. of the working faces with the incombustible content of the dust at least 65 percent has been considered adequate for years, the paper stated rock dust applications should be carried to within 40 ft. of the working faces.

Sells Gravel Plant

SYG SUSAG has sold his sand and gravel business at Crosby, N. D., to Clarence Raaum who manufactures concrete block in that city. Mr. Raaum plans to move the block plant to the gravel pit.

Blue Gravel Deposit Found

APPROXIMATELY 65 rods of blue gravel, especially useful as a concrete aggregate, have been discovered on a farm near Union City, Ohio. The property is owned by Russell R. Brooks who believes there may be four or five acres of land underlaid with the gravel, and tests are being made to determine its value. Blue gravel generally is regarded as having a much firmer texture than brown gravel, said Mr. Brooks.

Gravel Products Corp., Buffalo, N. Y., is using the above billboard sign on Lake Shore Road entering Buffalo to feature the fact that the company has 30 transit mixers to serve customers in the area. The sign is brilliantly lighted at night to catch the eye of thousands of motorists on the highway

Dust Collecting System for Slag Plant

NATIONAL TUBE CO. has completed engineering work for a proposed dust collecting system at its slag crushing plant, Lorain, Ohio, Robert Urguhart, general superintendent of the Lorain mills, announced. E. C. Tatum, chief engineer, explained that the system will operate at 92 percent efficiency in the collection of dust resulting from operations of the slag crusher. Two fans, each driven by a 100 hp. motor will be required, each having a capacity of some 70,000 cu. ft. per min.

Report Investigations of Two Fluorspar Deposits

WARTIME INVESTIGATIONS of two fluorspar deposits in Hardin County, Ill., are described in two separate publications released by Bureau of Mines entitled "Report of Investigations 4315—Investigation of the Du-Bois Fluorite Property, Hardin County, Ill." and "Report of Investigations 4324—Core Drilling at the Victory Fluorspar Mine, Hardin County, Ill." Free copies of either or both reports may be obtained from the Bureau Publications Distribution Section, 4800

Bentonite Discovery

STUDIES of Wyoming-type bentonite have revealed that the blue-gray subsurface material, now rejected in mining because of a deficiency in the necessary colloidal properties, becomes similar to high-grade material in important respects if permitted to oxidize, Geological Survey reports. This blue-gray material is identical in chemical composition and iron content with the green near-surface bentonite now being mined, but it was found that the iron in the blue-gray material is predominantly in the unoxidized or ferrous state, whereas in the green material, the iron has been oxidized to ferric iron.

Expands Sand and Gravel Fleet

WARNER COMPANY, Philadelphia, Penn., in expanding marine operations, has increased from 5 to 12 the number of welded steel barges it has on order from Dravo Corp. The 130-ft. x 34-ft. craft will be used to transport sand and gravel.

Construct Agstone Plant

FORBURGER STONE CO., Lincoln, Neb., is constructing a plant near Manhattan, Kan., for processing limestone.

GREATER EFFICIENCY AND ECONOMY

Photo courtesy Joy Mfg. Co., Sullivan Division.

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INDUSTRY *news*

Three Gravel Plants Open in Iowa

THREE new sand and gravel plants have been established in the vicinity of Sumner, Iowa. Reisner Sand and Gravel Co. is located some ten miles northeast of the city and is owned by Lloyd Reisner and C. G. Niemann. Mr. Reisner formerly operated a plant a quarter mile northeast of his present location for six years. The new plant, largest of the three, produces concrete sand, pea gravel, mortar sand and concrete rock.

CARL AND ED ZUPKE are producing washed sand, pea gravel and 1-in. rock eight miles east of Sumner. Oscar Nolte is owner of the third plant, located eleven miles south of the city. Over 250 tons of sand are washed per day. All three plants are designed to handle and wash 500 tons of sand per day, besides grading the pea gravel and 1-in. rock.

Freight Requirements Increased in West

WEST COAST freight car requirements for the final quarter of this year will be 10.4 percent greater than the requirements for the like quarter of last year, according to an estimate by the Pacific Coast Transportation Advisory Board. However shipments of gravel, sand and stone are expected to require 65,199 cars, an increase of 57 percent. Bob Mitchell, president, Consolidated Rock Products Co., Los Angeles, Calif., is a member of the regional shippers' Advisory Committee.

Stone Company Expands

MANHATTAN STONE COMPANY, Manhattan, Kan., plans to expand its present building by constructing a 22- x 88-ft. shed type addition, Henry Bayer, owner-manager, announced. The addition, to be of stone construction, will cost $1800 and will be used as a truck shelter and equipment repair shop.

Begin Gypsum Operations

COLUMBIA GYPSUM PRODUCTS CO. has started mining 100,000 tons of pure gypsum from its mine at Windermere, B. C., for export by way of Vancouver, Wash. T. H. Palmer, Spokane, engineer, has been supervising preparatory work and road construction. A large portable compressor has been shipped from Spokane. The crushing plant is being completed at Velox, near Spokane, and will cost $50,000. The corporation also plans a wallboard plant, calcining unit, storage plant, and office buildings.

Limestone Quarry Sold

NOLAN STONE CO. has sold its limestone quarry and crushing plant at Prospect, N. Y., to Eastern Rock Products, Inc., operator of several quarries in central New York. The purchasing company also operates a sand and gravel plant near Boonsville, a sand pit near Barneveld and a quarry, agricultural limestone plant and asphalt mix plant in Oriskany Falls. Harold W. Owens is president of the corporation with John V. Owens, vice-president in charge of production; C. A. Munz, vice-president in charge of sales, and H. H. Kerwin, treasurer. Ralph Nolan is president of the Nolan firm which purchased the Prospect plant some four years ago. Present plant capacity is about 3500 tons per week, and the limestone deposit being worked is said to contain 50,000,000 tons of usable material.

Refractories Plant Expands

BASIC REFRACTORIES, INC., Cleveland, Ohio, is engaged in an expansion program at its Maple Grove plant to make basic brick used in the lining and relining of rotary kilns, industrial furnaces and in basic open hearth and electric steel furnaces. The new facilities are expected to be in production late this year.

Last September, after considerable delay due to a shortage of materials, Basic placed in operation a large kiln for the manufacture of dead-burn dolomite. This resulted in a 40 percent production expansion and increased the company's facilities 70 percent over the pre-war period.

Plant Improvement

UTAH ROCK ASPHALT CO., Salt Lake City, Utah, is completing a $40,000 improvement project at Sunnyside and has leased its plant to Ute Rock Mining Co. A new crushing bin and receiving bin have been installed and machinery reconditioned, while at the mine a new loading bin was built, overburden stripped from an area to be mined and road improvements were undertaken. As a result, asphalt output will be increased to 400 tons per day, doubling previous output.

Modernization Program Is Completed

PACIFIC COAST AGGREGATES, INC., San Francisco, Calif., with completion of a new plant at Eliot, Calif., will reach the end of a three-year program of modernization of facilities. The Eliot plant will have an estimated loading capacity of 1000 t.p.h. In addition, during the past five years, the company has largely replaced its truck fleet, used in transporting ready mixed concrete, with more modern equipment. The number of such vehicles operated by the company also has been increased.

12-Mile Conveyor Belt for Sand and Gravel

APPROXIMATELY 5,600,000 tons of sand and gravel will be transported from gravel deposits to dam site five miles away by conveyor belt in building the $100,000,000 Hungry Horse Dam in Montana. United States Rubber Company has been awarded the contract to supply 12 miles of conveyor belt which will be constructed across Flathead River near Devil's Elbow, Mont.

Fire Damage

FIRE of unknown origin recently destroyed the mill, machine shop and storage house of Regal asbestos mine, near Globe, Ariz., with loss estimated at $100,000. The mine is operated by the Arizona Chrysotile Company.

Moves Offices

VIRGINIA-CAROLINA CHEMICAL CORPORATION has announced removal of its administrative offices to 401 East Main Street, Richmond 7, Va. The company processes all grades of phosphoric acid, sodium phosphates and calcium phosphates, phosphate rock, potash plant foods, plant insecticides, industrial cleansers, cotton and burlap bags.

Installs Dust Collector

WARNER CO., Philadelphia, Penn., has installed a No. 205 K.D. Dustube Collector at its McCoy plant to relieve an extremely dusty condition. The Collector was manufactured by the American Wheelabrator & Equipment Corp. and erected by Warner Company employees.

Limestone Institute Convention

THE AGRICULTURAL LIMESTONE INSTITUTE has set February 21-22, 1949, as the dates for its Fourth Annual Convention to be held at the Edgewater Beach Hotel, Chicago, Ill., Henry A. Huschke, managing director, has announced. The proposed program will cover production, marketing, and an interpretation of the labor, wage, and tax laws. In addition a half-day session will be devoted to problems in connection with operating an agricultural limestone plant.

Start Sand and Gravel Plant

CHARLES MARKHAM, president of a new corporation formed for the purpose of producing concrete and masonry sand and gravel in Avon, Ohio, has announced that equipment is now being installed, and that the plant will be in operation shortly with a capacity of 60 tons per hour. Ed Nemeth is vice-president of the firm; Art Nemes is secretary-treasurer, and George Karkelli is manager.

Seek to Expand State Cement Plant

JARVIS DAVENPORT, chairman of the South Dakota State Cement Plant Commission, has revealed that the 1949 legislature will be asked to authorize a $1,500,000 bond issue for expansion of the plant. Proposed expansion will double capacity which at present is not enough to meet demands for the next ten years, he said.

Expand Operations

WAYNE AND HARRY PRESSNELL, Columbia, Tenn., have purchased stock in the Columbia Rock Products Corp., Inc., for Pressnell Mining Co., and will use the Pressnell mining and trucking equipment to expand Columbia's limestone and rock business, and also will do general contracting, excavating, mining, road grading and allied work.

Materials Handling Exhibit

THE THIRD national Materials Handling Show will be held January 10-14 at the Convention Hall, Philadelphia, Penn. Almost 200 companies are planning to exhibit their various systems of handling materials in production and shipment.

Portland Cement Production

PRODUCTION of 17,757,000 bbls. of finished portland cement in June, 1948, has been reported to the Bureau of Mines, representing an 11 percent increase over that reported for June, 1947. Mill shipments totaled 21,426,000 bbls., an increase of 18 percent over the June, 1947, figure, while stocks of 12,417,000 bbls. on June 30 were 27 percent below the June, 1947, totals. Clinker output in June, 1948, amounted to 17,336,000 bbls., representing an increase of 12 percent over the corresponding month of the previous year.

RATIO (PER CENT) OF PRODUCTION TO CAPACITY

	June 1948	June 1947	May 1948	April 1948	March 1948
The month	89.0	81.0	86.0	80.0	71.0
12 months	80.0	74.0	80.0	78.0	79.0

Short Course for Technicians

A SHORT COURSE of instruction for technicians in the ready mixed concrete and sand and gravel industries will be held at the University of Maryland, November 15-20. As before, the course is being sponsored by the College of Enginering of the University of Maryland, the National Sand and Gravel Association and the National Ready Mixed Concrete Association.

Award Contract to Build Cement Plant

TEX-MEX CEMENT CO. and Erle P. Halliburton Co., subsidiary, have awarded the contract for construction of a complete new cement plant at Corpus Christi, Texas, to Macdonald Engineering Co., Chicago, Ill. James W. Macdonald, president of the latter company, said work will begin immediately and that piles for foundations already have been driven.

Open Crushing Plant

MAURICE, F. K., CHARLES H. AND W. P. GRINSTEAD, brothers, have announced plans to open a rock crushing plant near Haddock, Ga. Capacity will be 50 to 60 t.p.h.

Slag Group to Meet

THE NATIONAL SLAG ASSOCIATION will hold its annual meeting November 18 and 19 at the Wardman Park Hotel, Washington, D. C.

Coming Conventions

November 18-19, 1948—
National Slag Association, Annual Meeting, Wardman Park Hotel, Washington, D. C.

December 3-4, 1948—
Missouri Limestone Producers Association, Annual Meeting, Hotel Governor, Jefferson City, Mo.

January 10-14, 1949—
Materials Handling Exposition, Convention Hall, Philadelphia, Penn.

January 18-20, 1949—
National Agricultural Limestone Association, Inc., 4th Annual Meeting, Washington, D. C.

Jan. 31-Feb. 3, 1949—
National Concrete Masonry Association, 29th Annual Convention and Concrete Industries Exposition, Cleveland Public Auditorium, Cleveland, Ohio.

February 7-9, 1949—
National Crushed Stone Association, 32nd Annual Convention, Hotel New Yorker, New York, N. Y. There will be no exhibit.

February 13-17, 1949—
American Institute of Mining and Metallurgical Engineers, Annual Meeting, San Francisco, Calif.

February 14-18, 1949—
National Ready Mixed Concrete Association, 19th Annual Convention, Hotel New Yorker, New York, N. Y. There will be no exhibit.

February 14-18, 1949—
National Sand and Gravel Association, 33rd Annual Convention, Hotel New Yorker, New York, N. Y. There will be no exhibit.

February 21-22, 1949—
Agricultural Limestone Institute, 4th Annual Convention, Edgewater Beach Hotel, Chicago, Ill.

Feb. 28-March 4, 1949—
American Society for Testing Materials, Spring Meeting and A.S.T.M. Committee Week, Edgewater Beach Hotel, Chicago, Ill.

Sand and Gravel Producers Receive Safety Awards

MARQUETTE plant of the Marquette Cement Manufacturing Company at Memphis, Tenn., and the Works No. 9 plant of the Pittsburgh Plate Glass Co. at Crystal City, Mo., won the top safety awards for 1947 in the 19th annual National Sand and Gravel Association Safety Competition, for which they will receive engraved precast concrete plaques provided by ROCK PRODUCTS. The competition was conducted by the Bureau of Mines. The Marquette plant had no disabling injuries in a total worktime of 126,483 man-hours, while the Works No. 9 plant of Pittsburgh Plate Glass Co., had an injury-free record during a total work-time of 88,238 man-hours.

A total of 68 sand and gravel operations participated in the 1947 Competition. There were 132 disabling injuries at these plants during an aggregate of 4,685,976 man-hours of work. The injury-severity rate of 3.338 days lost per 1000 hours of work was improved considerably from the corresponding rate of 5.584 in 1946 and also was better than the average rate of 4.672 for the 19 years of the Competition.

Employees and officials at 20 of the 68 competing sand and gravel operations in the 1947 contests operated throughout the year without any lost-time accidents, according to Bureau of Mines. Men at these 20 plants, of which two were the trophy winners, worked 778,280 man-hours or 17 percent of the 4,685,976 man-hours worked in all the enrolled plants.

N.C.S.A. Short Course

THE THIRD N.C.S.A. Short Course, a school for salesmen, will be held February 2-5, inclusive, at the U. S. Chamber of Commerce, Washington, D. C., National Crushed Stone Association has announced. In addition to talks on fundamental matters concerning crushed stone, the course will consist of informal lectures by specialists covering such subjects as bituminous concrete, surface treatments, portland cement concrete including reactive aggregates and compatibility of aggregates, trickling filter media, and other technical subjects.

Sand and Gravel Production

SAND AND GRAVEL statistics for 1947, as reported to Bureau of Mines, show that production totaled 287,659,000 short tons valued at $216,869,000. These figures represent an increase of 13 percent in quantity produced and 27 percent in vaue over the 254,131,000 tons valued at $171,386,000 reported for 1946. Approximately 74 percent of the total production was supplied by commercial plants and 26 percent by Federal, State, county, and municipal governments. The largest increase in sand was for fire or furnace use, and in gravel for railroad ballast.

Sales by commercial producers in 1947 amounted to 212,562,417 short tons, representing an increase of about 11 percent over the 192,092,566 tons produced the preceding year. In addition, sales of all kinds of sands and of gravel showed increases in almost every type of use, with washed, screened, or otherwise prepared sand and gravel comprising 91 percent of the total commercial production. Average value was 89c per ton.

Awarded Honors for Annual Report

MARQUETTE CEMENT MANUFACTURING CO., Chicago Ill., has won top honors for the excellence of its annual report for the fourth consecutive year, and the "Oscar of Industry" trophy has been presented to W. A. Wecker, president of the Marquette company. Announcement of the winning report for 1947 was made by the independent board of judges in the *Financial World* Annual Report Survey.

Pavement Yardage

AWARDS of concrete pavement for the month of September and for the first nine months of 1948 have been announced by the Portland Cement Associations as follows:

	Square Yards Awarded During Sept. 1948	During First 9 Mos. 1948
Roads	2,753,211	19,641,284
Streets and Alleys	2,217,247	15,411,488
Airports	128,800	1,996,761
Total	5,099,258	37,049,533

Plans Perlite Plant

FRANK HALL has announced the possibility that he may open a perlite processing plant near Artesia, N. M. Perlite rock is found in great quantities in the volcanic areas in the west part of the state, he said.

Constructs Second Largest Feldspar Plant

CONSOLIDATED FELDSPAR CORP. is completing at Parkdale, Colo., what is reported to be the second largest feldspar plant in the world. The corporation also produces mica and silica at the Parkdale plant.

Opens Gravel Plant

AL BLOMBERG has established a washed sand, gravel and crushed rock plant at a gravel pit near Braham, Minn. Mr. Blomberg has a ten-year lease on the pit and an output contract with the Miller family who own the farm where the pit is located.

N.L.A. Directors' Meeting

A VERY enjoyable and profitable meeting of the Board of Directors and Executive Committee of the National Lime Association was held at The Cloister, Sea Island, Georgia, on September 28 and 29, 1948. This was the first meeting ever held by this organization at this resort, and the directors were practically unanimous in their desire to return to The Cloister for a board meeting next Fall. Dates for that meeting are expected to be around the first of November.

Among topics of discussion were the effect of the "Cement Case" on the industry, the Association's program for obtaining 15 percent depletion on limestone when calcined or when used for chemical purposes, and plans for presenting the industry's petition to the House Ways and Means Committee after the elections early in January, 1949, as well as the reaction from some members of Congress on the subject.

Operating Division Program

WALLACE WING, Chairman of the Operating Division, presented plans for the National Lime Association Operating Division Meeting scheduled for November 4-6 at the Palmer House, Chicago, Ill. As in the past, this meeting was to be open only to members of the National Lime Association and special guests.

PROF. K. B. WOODS, Purdue University, presented a brief report on the recent N.L.A. Research Fellowship on lime stabilization at the University. Only general conclusions were made, as the first stage of the research will not be completed until January, 1949. However, from the basis of tests made, it appears that the addition of hydrated lime in varying percentages will reduce the plasticity and increase the strength in varying degrees of a fairly wide range of soils.

The N.L.A. Agricultural Fellowship at five state agricultural experiment stations, as well as an agricultural fellowship meeting at College Park, Md., July 1-2, 1948, were reported on by W. W. Sprague, chairman of the Agricultural Research Committee, and the Board agreed that a new book on liming should be published at the conclusion of this research program.

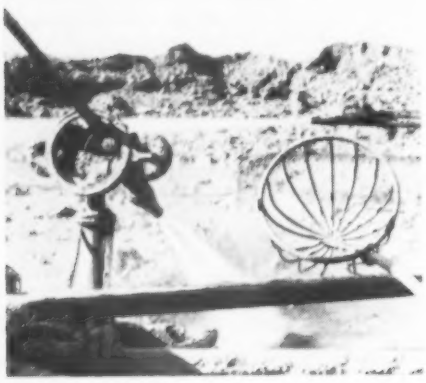
ROBERT S. BOYNTON outlined three new books involving trade waste treatment which the Association has either published or will publish within the next few months, entitled "The Use of Lime in Industrial Trade Waste Treatment," "Lime Versus Soda Ash and Caustic Soda for Neutralization," and "Lime: Handling Storage and Application in Treatment Processes." The latter bulletin will be authored by Dr. Willem Rudolfs, Rutgers University, and will consist of over 100 pages.

HINTS and HELPS

PROFIT-MAKING IDEAS DEVELOPED BY OPERATING MEN

Steel Basket Removes Obstructions

A STEEL BASKET mounted on a long wooden pole has proven a time-saver at one Florida phosphate operation. The valued material is pumped to

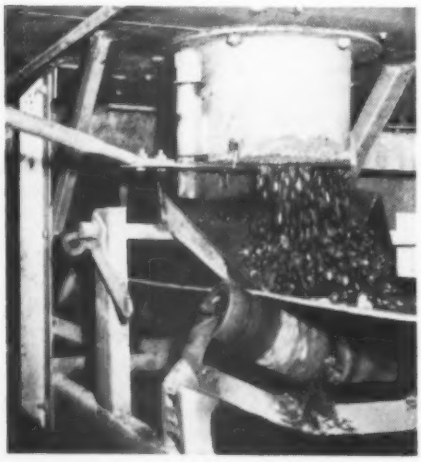


Steel basket used to remove obstructions in grizzly

the plant by a series of large diameter pumps. The first pump, generally 12 or 14-in., is protected by a 5-in. grizzly, and material is sluiced to this grizzly by one of several hydraulic guns. Often the grizzly tends to become fouled by foreign matter, such as roots, brush, etc. In this case the operator can reach out and remove the partial cause of the obstruction with the steel basket, which is kept handy at all times.

Blending Gates

ARRANGEMENT of 10 steel storage silos under a new sand and gravel plant in the Northwest is such that a series of 24-in. reclaiming belts serves to reclaim and blend the various materials so as to meet almost any specifications; in fact the contents of all ten tanks can be blended into a single aggregate if necessary.



Blending gates of simple but efficient design

The gates are a cylindrical section bolted to the bottom of the bin, the outlet of the cylinder being a horizontal steel plate that is opened and closed by means of an operating arm. The operator sets this gate as per markings he has available so that the desired blend can be made. Daily samples are taken and sent to the plant laboratory where a copy of screen data is made and given the operator so that he may in the future better judge the result of his gate settings.

Unusual Overflow System

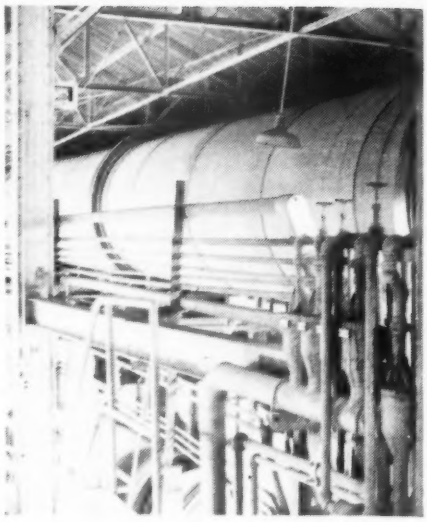
A NEW phosphate flotation plant in Florida has done away with the conventional inner launder system of overflow. American traction type thickeners, 375-ft. in diameter, are used as part of the water re-use system, and overflow has been changed to a system having a concrete ditch around the outer periphery. The thick-

Thickener overflow is collected in the launder through pipe openings

ener overflow enters this large concrete launder through pipe openings, as shown in the illustration. More even flow of overflow and less operating troubles due to solids settling in the older type of system are given as advantages.

Visible Water Controls

VISIBLE water controls are a feature at the Houston, Texas, plant of Ideal Cement Co. One of the kilns is a 9½ x 250-ft. Traylor with water cooled trunnion bearings. The inlet and outlet water with control valves for the several bearings is carried to a centrally located place near the burner platform where the water from the bearings drops to a funnel-shaped receiver in such a manner that water always is visible to the operator. The several funnels are welded to a manifold of larger diameter that acts as an outlet for the waste water. This



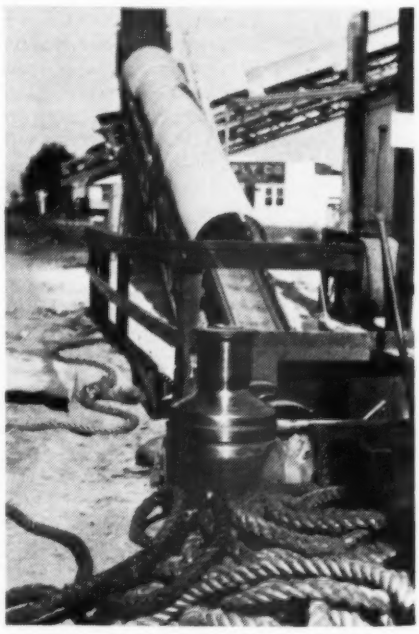
Kiln with visible water controls

convenient arrangement seems to be one that well could save the loss of a trunnion bearing should the water supply fail for a short time.

Radial Stockpile System

PINELLAS LUMBER CO., St. Petersburg, Fla., has a Barber-Greene radial stockpile system said to be very unusual for a block plant. By use of this system, aggregates space can be utilized to the maximum degree and the amount of equipment required can be kept low.

In the illustration, the radial stacker is the unit in the background and is fed by the covered conveyor leading to it. Cars are spotted at the track



Radial stacker in background is fed by covered conveyor. Cars are spotted by vertical-gandy-head car puller with 1½-in. manila rope

hopper by a small vertical-gandy-head car puller with 1½-in. manila rope. On the end of the rope a husky chain sling has been attached. This chain is fastened to the car to be moved thereby reducing rope damage often caused by sharp corners of metal.

Portable Flood Lights

CONTRACTORS and aggregate producers found much night work necessary in order to complete operations

Portable light plant for night work

on the Maine Turnpike by the end of last year. Light was supplied by portable rigs consisting of four flood lights whose electric energy was supplied by a gasoline driven, Kohler light plant, all mounted on rubber for movement around the job.

Truck Scaffolds

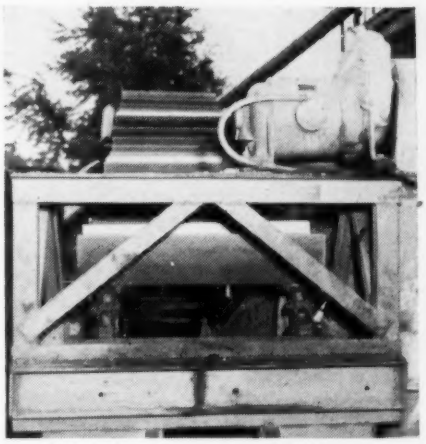
USE OF MATERIALS handling trucks as mobile scaffolds often can save time and expense in servicing overhead plant installations. Such work can be done efficiently by using high lift fork or platform trucks, or from a platform mounted on the boom of a crane truck. A platform of this type should be rigged with safety railings and can be equipped with outside racks or boxes for materials and tools.

Scheduling the trucks for this maintenance usage in off duty times, as between rail shipments or at night, doesn't interfere with plant operations, and does away with using ladders or constructing scaffolds. The mobility of the trucks also proves valuable, especially in painting ceilings, checking wiring and doing other maintenance work where it is necessary to follow along the entire length of a job.

Scalping Sized Material From Gravel Pit Flow

AT STANDARD MATERIALS CO., Clinton, Ind., oversize from a pit-run scalping screen, plus 1¼-in., that would normally fall to the primary crusher, can be intercepted by a swing conveyor which discharges over a 2-in. grizzly plate. Oversize from the grizzly is chuted to the primary crusher. The swing conveyor is lowered to intercept the stream ahead of the primary crusher by means of a hand operated winch. An electric motor that powers the 10-ft. long swing conveyor is mounted on the conveyor frame as an integral part of the unit.

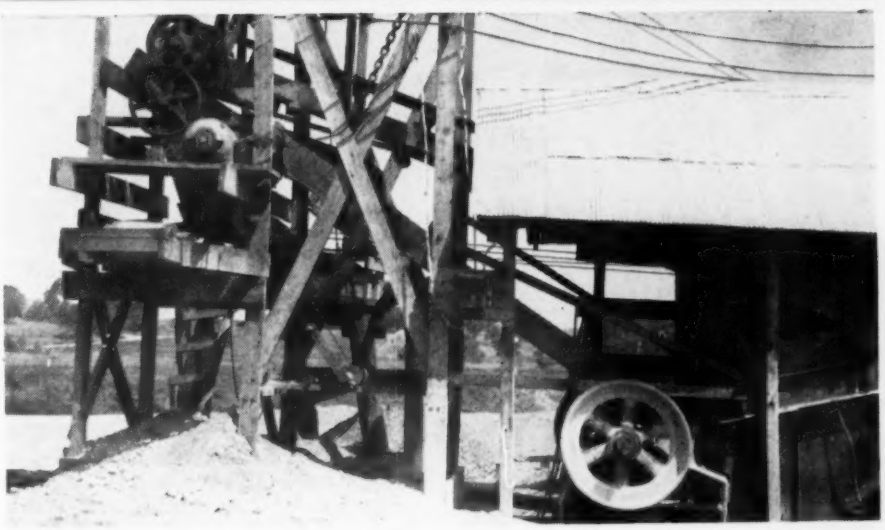
Sized material passing through the grizzly, plus 1¼-, minus 2-in., falls to a 15-ft. conveyor belt for transfer to a 8-cu. yd. truck hopper. This material is in fair demand for county and private road maintenance purposes. Material that is scalped out of the flow does not pass the primary crusher, and is not elevated 55-ft. by the 220 ft. center to center main plant conveyor, thus saving wear on these two pieces of equipment.



Drags remove water-logged wood chips from washed gravel

Drags Remove Wood Chips From Gravel

A SAND AND GRAVEL operation in the Pacific Northwest dredges material from a river which has long had logging and saw mill operations along the banks. As a result, and due to normal re-occurring floods, water-logged chips often get into the plant. However, such material is easily removed. The washed gravel passes to a drag, essentially a sand drag, that handles up to 1½-in. gravel. The gravel is introduced into the machine near the pool's water line and turbulence in the pool is sufficient to lift up and wash out the water-logged wood chips. There are two of these machines in the plant, both 24-in. wide and approximately 20-ft. long, driven by a 5-hp. Sterling, direct-power applicator motor.



Above: Hopper to right that receives pit-run material. Below: Swing conveyor, to the left, which is lowered by winch to intercept flow of material ahead of primary crusher

new machinery

ROCK PRODUCTS

Front End Loader

ARROW CONTRACTORS EQUIPMENT Co., Chicago, Ill., is producing an 8-cu. ft. front end loader that is

Three-wheel, 8-cu. ft. capacity front end loader

mounted on a tricycle frame, with power applied to the front wheels and the single rear wheel reserved for steering. Able to attain a speed of 15 m.p.h., the scooter is powered by a 9 hp. air-cooled engine. Clearance of bucket is 4½-ft. The manufacturer reports that this loader is sufficiently compact to work inside freight cars and other restricted places.

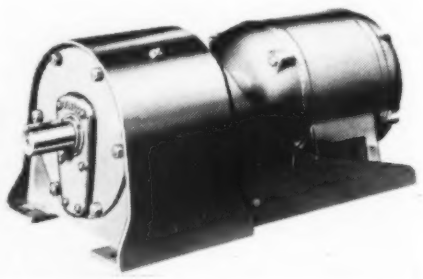
Smooth Rock Quarry Tire

B. F. GOODRICH Co., Akron, Ohio, has incorporated a new idea in its latest product: an absolutely smooth-contour rock quarry tire, to be used for free rolling wheels or where traction is not a problem. Advantages of this construction, the company claims, is that there are no edges or tread grooves to catch on sharp rocks or other obstructions which frequently cause tire damage. This new tire is at present being made in two sizes: 9.00-20, 12 ply and 14.00-24, 20 ply.

Smooth-contour off-highway tire development

Redesign Speed Reducers

FALK CORP., Milwaukee, Wis., has redesigned its line of speed reducers, with reported refinements and improvements of the all-steel line of Motoreducers. The company states that the new line retains all of the design features that have been proven over 16 years of operation; plus added adaptability and a stronger, lighter housing. In addition, the new units are equipped with a newly developed dirt and moisture-proof seal which protects gear and bearing lubricant against contamination. Shaft diameters have been increased to provide greater torsional strength and increased overhung load capacity.

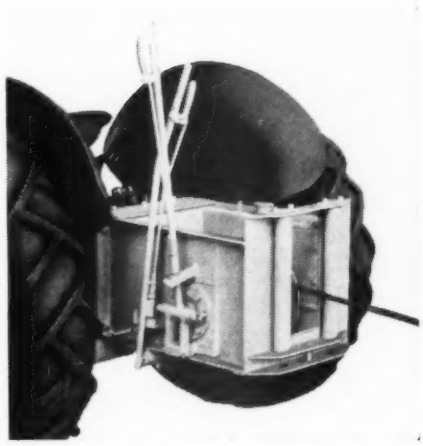


Adaptability, compactness, stressed in new speed reducer line

Included in the complete line are horizontal and vertical units of both integral and all-motor types for floor, wall or ceiling mounts. The basic speed reducer can be converted to right angle, V-belt, multi-speed, low ratio or other adaptations. Applications of these speed reducers include driving mixers, agitators, conveyors, pumps, dust collectors, screens, classifiers, fans, washers, plus other types of mill equipment.

Adaptable Tractor Winch

AMERICAN HOIST & DERRICK Co., Saint Paul, Minn., recently released information on its new tractor winch that is adaptable to many wheel-type tractors, the American Tractowinch. This new unit is a single drum type, with a maximum capacity of 7500 lb. single line pull on the first layer of cable, and is so designed as to be easily installed or removed when the P.T.O. shaft is required for other uses. Outstanding features claimed



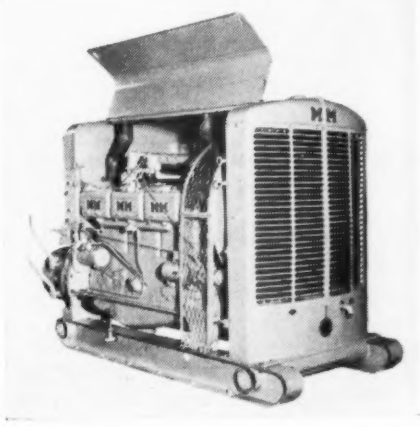
Winch for wheel-type tractors with fairlead rollers

for this winch are fairlead rollers which allow a sharp offlead of the cable to either side and a drawbar built into the winch frame which allows the tractor to perform regular towing jobs without removing the unit.

Natural Gas Engine

MINNEAPOLIS MOLINE POWER IMPLEMENT Co., Minneapolis, Minn., has developed an engine particularly adaptable for natural gas or butane fuel, known as Model 1210-12A.

It is a 12-cylinder unit which is said to provide smooth power as the bearing loads are distributed over more cylinders. Water cooled manifolds keep down operating temperatures. Cylinder blocks are cast of ample dimensions so that they may be rebored to obtain new engine performance. Both cylinder heads and



Twelve-cylinder engine designed for operation with butane or natural gas

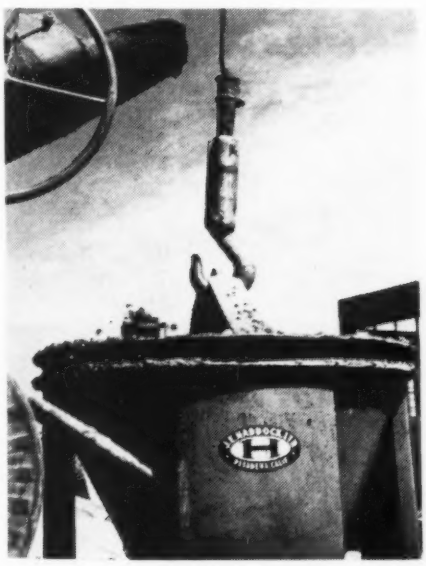
blocks are cast in pairs and are removable from the crankcase, simplifying servicing. Cast iron pistons have three compression rings and one oil control ring. Crankshafts are of drop-forged steel. Connecting rod bearings are precision shell type and are replaceable. The camshaft is cast of Proferall metal, a special alloy. A full-pressure lubrication system forces oil through drilled passages to main, connecting rod, and camshaft bearings. Two oil filters are used.

Engine specifications include: bore and stroke, 4⅝- x 6-in.; piston displacement, 1210 cu. in.; engine operating speed for continuous duty, 1300 r.p.m.; maximum corrected horsepower at 1300 r.p.m. 215 for natural gas and 230 for butane; compression ratio, 8-1; and compression pressure, 190 p.s.i. for both fuels.

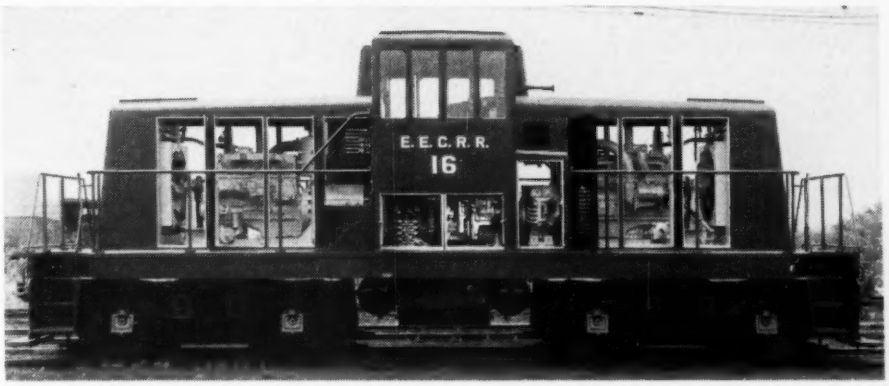
Wire Rope Swivel For Crane Loads

GENERAL MACHINE & WELDING WORKS, Pomona, Calif., recently introduced a swivel to be used with wire rope under stress. Applications of the Miller Swivel are for attaching drop-balls; hoisting concrete buckets, etc. It is claimed that the anular ball bearing swivel can be turned with thumb and forefinger when holding a 77,000 lb. load.

These swivels are designed to use the entire bearing surface of three ball races, with the freely rolling surface provided enabling the swivel to carry the maximum load for the smallest possible diameter and length. They are made of high strength steel in sizes comparable to wire rope: 1-, ¾-, ⅝-, ½-in., etc., and are available in ten different styles such as hook and clevis, clevis and eye, swedge and stud, to name a few. The swivel bearings are life-time grease packed at the factory, and are cadmium plated to prevent rust and deterioration.



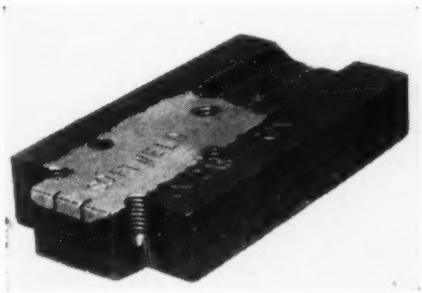
Wire rope swivel shown here on concrete bucket, has other applications



Diesel-electric locomotive, 65-ton class, with doors open showing twin diesels

Machinable Weld Electrode

LINCOLN ELECTRIC CO., Cleveland, Ohio, is now producing a new electrode for depositing dense, soft machinable welds in gray iron castings. Named Softweld, the electrode is non-ferrous and operates with a soft steady arc on either AC or DC. According to the manufacturer the new electrode is designed to cause the weld to flow over the bond to the cast iron with



Machinable weld on gray iron casting

a minimum of penetration and heating of the base metal, producing a smooth dense, and well feathered deposit.

Improved 65, 80 Ton Switching Locomotives

GENERAL ELECTRIC CO., Schenectady, N. Y. recently announced a series of newly incorporated improvements in its standard model 65 and 80 ton switching locomotives. Changes in these diesel-electric units give increased power and improved continuous tractive effort ratings. These models are equipped with two supercharged diesel engines with a maximum total rating of 550 hp., or 420 hp. actually delivered to the generators for traction. This compares with 330 and 440 hp. on the earlier models.

Maximum tractive effort has not been changed because there has been no change in the weight of the units; however the continuous tractive effort ratings have been improved. The GE-747 motor with which the new locomotives are equipped is a self-ventilating, double reduction motor that replaces the non-ventilating type used in the earlier models. It is stated that these higher ratings enlarge the field of application and make it possible for the engines to handle heavy jobs without the need for added blower equipment.

Multiple Records Marked On Single Circular Chart

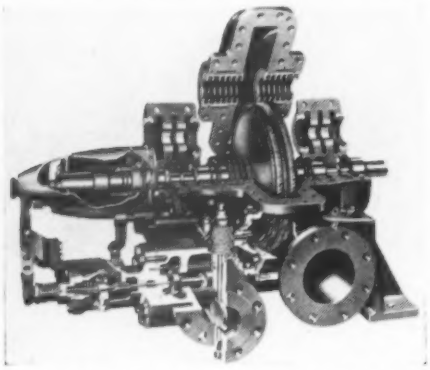
FOXBORO CO., Foxboro, Mass., recently exhibited for the first time an instrument capable of marking as many as six different records on a single circular chart at six second intervals. The new recorder uses a Rotacolor pen wheel, holding six recording pens which are magnetically selected in turn and held in recording position by a single pen arm. Records are of colored dots so closely spaced as to make virtually continuous lines. A dry ink insures clean records, and the instrument will operate continuously for several weeks without need of re-inking.

This new recorder uses only one measuring system: resistance bulb or EMF type, but a positive-acting switching unit automatically brings individual pens into recording position at proper intervals. Except for its unique recording mechanism, the new recorder conforms to the design and construction which is standard for other instruments produced by this company.

Instrument able to mark up to six different records, in separate colors, on same chart

General Purpose Turbine

WESTINGHOUSE ELECTRIC CORP., Pittsburgh, Penn., is now producing a new all-weather, general purpose steam turbine for driving industrial pumps, blowers, compressors, and small generators. This new turbine, the Typee, is available in three wheel sizes: 16-, 20- and 25-in., with power applications over a range of 5- to 1500-hp. with steam conditions up to 600 lbs. ga at 750 degrees F.; and speeds of 1000 to 7000 r.p.m. Equipped with heavy duty parts the turbine will operate at 1500 lbs. ga at 950 deg. F.



Turbine developing from 5 to 1500 hp.

Felt and labyrinth bearing seals protect the turbine lubricating system from contamination by water or abrasive dust. The basic turbine is equipped with a shaft type governor mounted in a rugged casing that is said to completely protect the governor assembly and shaft end.

Industrial Vacuum Cleaner

BREUER ELECTRIC MANUFACTURING CO., Chicago, Ill., is now producing a new model industrial vacuum cleaner known as the Tornado, which is available in four sizes: 2, 3, 5 and 7½ hp. that move from 200 to 360 c.f.m. of air. These cleaners have static water lifts ranging from 60- to 105-in., with air velocities from 315 to 480 m.p.h. All sizes are also available in explosion-proof models if desired. The units are mounted on three 8-in. ball bearing casters for portability.

Powerful industrial vacuum cleaner, available in four sizes

A special trip device on the machine allows it to be changed from suction to blowing, and due to a filter of 1,000-sq. in., clean air is assured in the blowing cycle, according to the manufacturer. It is also stated that the cleaner can pick up wet or dry substances without harm to the filter or tank.

Combination Truck-Scoop

ELWELL-PARKER ELECTRIC CO., Cleveland, Ohio, has announced an electric power industrial truck equipped with a special type of scoop for picking up, transporting, delivering or piling loose materials. The scoop is attached to the truck's tilting and elevating mechanism and all controls are centralized at the driver's station. The truck's upright column may be tilted forward 5 deg. from perpendicular or back 15 deg. Capacity of the scoop is 12 cu. ft., capacity weight of load is 2000 lbs., and speed of the truck with load ranges up to 5½ m.p.h. In addition, the scoop is interchangeable with a standard type fork.

Truck equipped with special scoop for handling loose materials. Scoop may be replaced with fork attachment

Save Space, Weight In New Speed Reducer

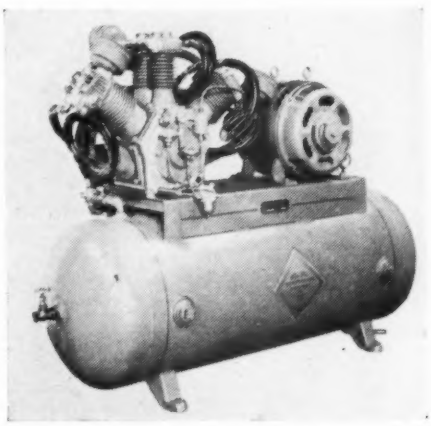
FAIRBANKS, MORSE & CO., Chicago, Ill., announces that its axial air gap motor is now available as a motor speed reducer unit. As a consequence of its inherent design, according to the manufacturer, the new gear reducer, axial air gap motor combination is the most compact unit of its type offered, and is less than half the size and weight of former types. Available in ratings from ¾ to 10 hp., these units are symmetrical in design with no separate right- or left-hand assemblies, and the motor may be removed from the gear housing for separate operation.

Space-saving, lightweight, motor and speed reducer unit

This new motor, gear reducer unit employs two ratios of single helical gears arranged in simple gear trains, resulting in the highest efficiency available in mechanical transmission of power. Another feature claimed for this new unit is that the motor and gear shafts are parallel, with the centerline of the motor coinciding with the centerline of the low speed shaft. The motor shaft rotates on ball bearings, while gear shafts are mounted on tapered roller bearings.

Compressor That Can Grow

AIR-FLO COMPRESSOR CO., Akron, Ohio, recently started production of a compressor, using 18 principal parts, that is a basic unit for 48 different models of 1, 2, 3, 4 or 6 cylinder pumps in single or two-stage types. The manufacturer asserts that this represents the largest number of models ever made from one standardized set of parts, with all parts inter-



Basic compressor that is available in 48 different models

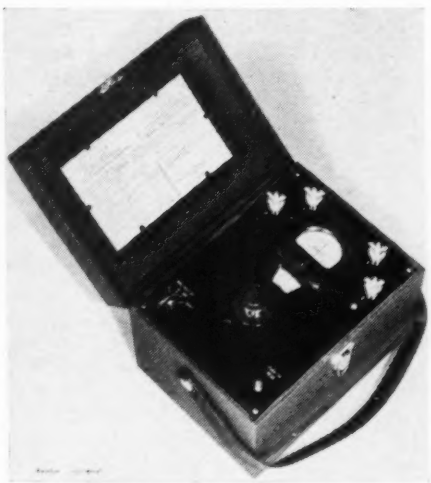
changeable from the smallest to the largest pump. According to designer of this compressor, it is possible for an operator to purchase the size pump suitable for immediate needs, and as requirements for air expand, to buy additional parts to increase the compressor's capacity or pressure.

A further advantage claimed for this unit is that complete interchangeability permits carrying a small basic inventory of replacement parts instantly available for all compressors in the plant, regardless of size or model. This line of compressors is available in sizes from ½ to 40 hp. with 2.5 to 275 c.f.m. capacity at 30 to 300 lbs. pressure in vertical, V-type or side angle construction; with single, twin or radial staggered cylinder arrangements.

Geophysical Prospecting

ASSOCIATED RESEARCH, INC., Chicago, Ill., has developed an instrument for geophysical prospecting, known as Vibroground Model 258, which uses the four point method. Location of sand, gravel, clay, depth to bed rock, etc. can be determined by means of the four point method, which permits controlling the depth of penetration by varying the distance between prods. It is claimed that by using the vibroground principle, the instrument remains uneffected by stray AC or DC currents and potentials. It has a normal operating frequency of 92 cycles, and it is therefore further claimed that the instrument is uneffected by stray commercial frequencies which might be present in the area under test.

Incorporated in the instrument is a dial type potentiometer having a 13-in. scale length, with design calling for accuracy remaining at 1 percent of full scale length. A bridge type circuit using a D'Arsonval galvanometer provides a null balancing method that is reported to eliminate errors usually encountered in direct indicating instruments.

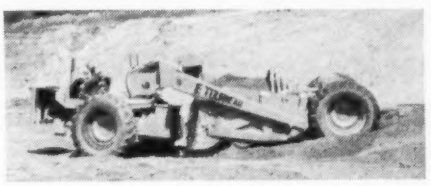


Push-button instrument for accurate geophysical prospecting

Small Self-Powered Scraper

R. G. LETOURNEAU, INC., Peoria, Ill., recently added a new, small sized unit for high production earthmoving to its line of equipment, the model D Roadster Tournapull. Designed for self-loading, the one-man operated, two wheel tractor, scraper unit is particularly adapted to use in the rock products field. Powered by a 100 hp. diesel or gasoline engine, this unit travels at speeds up to 25 m.p.h. and is used with the E-9 Carryall Scraper, a 7-cu. yd. heaped measure unit.

A feature stressed by the manufacturer is the complete control of all steering and scraper operations by individual electric motors which the operator directs by means of toggle switches located on the control panel. Another feature claimed for this machine is a torque proportioning differential which automatically supplies power to the wheel on the firmest



Nine ton scraper unit controled by electric switches and motors

ground. Specifications for the rig include: length, 27-ft. 10¾-in.; width, 8-ft.; height, with cab, 8-ft. 6¾-in.; width of cutting edge, 7-ft.; and weight, 20,700 lbs. The rig has a turning radius of 19-ft.

Ointment for Burns

PHARMACEUTICAL PREPARATIONS, INC., Buffalo, N. Y., is marketing an ointment for industrial burns, known as R-52, which is said to be very effective in reducing employe lost time due to burn accidents. The manufacturer claims that application of the ointment gives quick relief of pain and muscular constriction common to most burns.

Hydraulic-Conversion Unit

TWIN DISK CLUTCH CO., Rockford, Ill., has announced its new Hydro-Sheave Drive, a hydraulic conversion device for small electric motors and internal combustion engines. Basis for this new unit is a twin-disk small hydraulic coupling, and it is claimed to smooth the flow of power from motors in the ¾ to 25 hp. range. This new unit is designed especially for use with Worthington QD V-belt sheaves. Applications for this drive cover a wide field: cranes, hoists, conveyors, winches, fans, blowers, compressors, machine tools, and other similar installations.

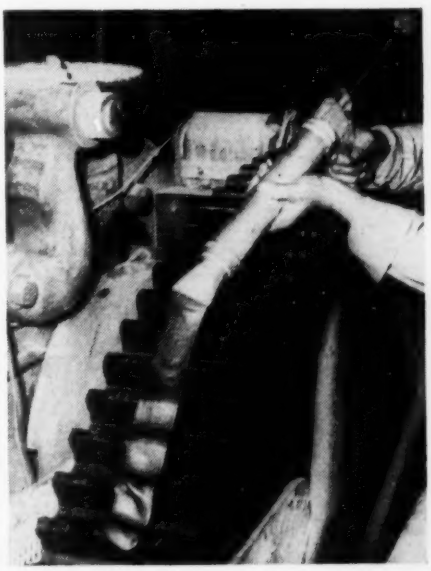
Sleeve bores are machined to fit standard N.E.M.A. motor shaft sizes. Anti-friction bearings are lubricated

Hydro-sheave drive unit for motors or engines in the ¾ to 25 hp. range

for life, and the unit is entirely self-contained, being supported on its own two bearings. This assures proper alignment of all moving parts and alignment of the unit to the power source. The drive also comes supplied with a chain sprocket, if desired.

Lubricant for Open Gears

KEYSTONE LUBRICATING CO., Philadelphia, Penn., has developed a new heavy duty lubricant for open gears working under severe conditions. This new grease, known as No. 32, utilizes a new method of application that is reported to have several advantages, chief of which is assurance that the grease reaches the pressure side of gear teeth. Packed in rigid, leakproof paper cartridges which fit in specially designed gun applicators, the lubricant is forced through a nozzle in a broad ribbon over exposed gear teeth. Melting point of this new product exceeds 400 degrees F. and it repels water, even at boiling temperatures. Long lubricating life is claimed.



Heavy Duty open-gear lubricant offered in handy new applicator package

Overall view of plant showing hydraulic station in foreground

BELT CONCENTRATION SYSTEM

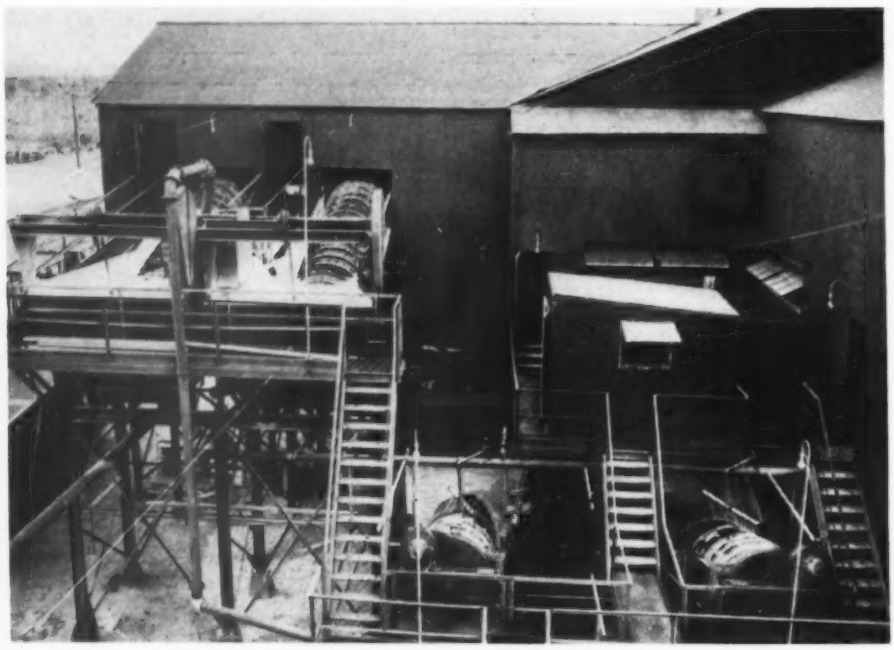
For Phosphate Recovery

By W. B. LENHART

NEW DEVELOPMENTS by the companies operating in the phosphate field of Florida possibly transcend anything to be found in any of the other non-metallic industries. While they represent a relatively small group of producers, numerically speaking, as individual companies they have gone ahead with plant developments and expansions that are truly outstanding.

Restoring the fertility of the soils of the world, not of the United States alone, is a prime necessity if the world is to sustain a constantly increasing population. Agronomists have repeatedly pointed out that it requires roughly 2.3 acres of agricultural ground to adequately supply one person. Yet, taking the world as a whole, there are said to be only 1.7 acres of such ground now available to feed one person. This simply means that there are now, and always have been a large number of people who are desperately hungry. The problem can only be solved by greater soil productivity.

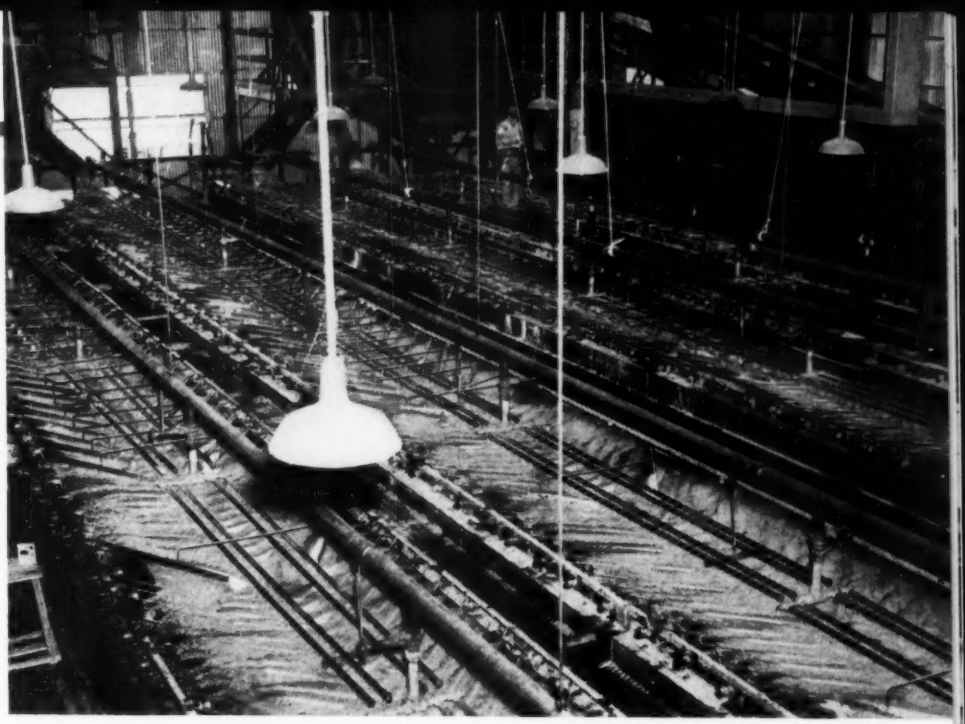
In this scheme of things the phosphate industry is doing more than its part to provide us with essential soil rebuilders, in huge tonnages, and at prices that remain firm while other costs skyrocket. Phosphate material is essentially a low priced commodity and like many other rock products, the freight on the material is often more than the price at the mine. To keep mine costs at bottom and on an even keel, producers have had to go into large scale and low cost production units and tie these two factors together with efficient operations.



Primary and secondary deoiling or rinsing units

The Coronet Phosphate Co., with its Florida office at Coronet, 3½ miles southeast of Plant City, Fla., and general offices in New York City, is one of the oldest producers in the area. In 1947 this company completed its new plant, referred to as the Eleanor Mine and located about 10 miles south of Plant City near Keysville, Fla. Like most of the other phosphate treatment plants, the new plant is made up of two units; the washer, for recovering the coarser screen sizes and about which we are not greatly concerned here, and the flotation section for the finer phosphate values. This new plant differs from the others in the district, however, in the use of a rather novel type of equipment, known as a "Belt Concentrator Machine." It was developed by the Coronet Phosphate Co., and consists essentially of a group of flat, wide, belt conveyors from which flotation concentrates, middlings, and tailings are recovered. (U. S. Patents 2,047,773 and 2,231,066 are now owned by Minerals Separation North American Corporation, New York, N. Y. It is the only installation of its kind any place in the world.

Coronet Phosphate Co., uses unusual belt classifier system to concentrate plus 48-mesh, and flotation for minus 48-mesh recovery. Large dewatering capacity permits reuse of big volume of water



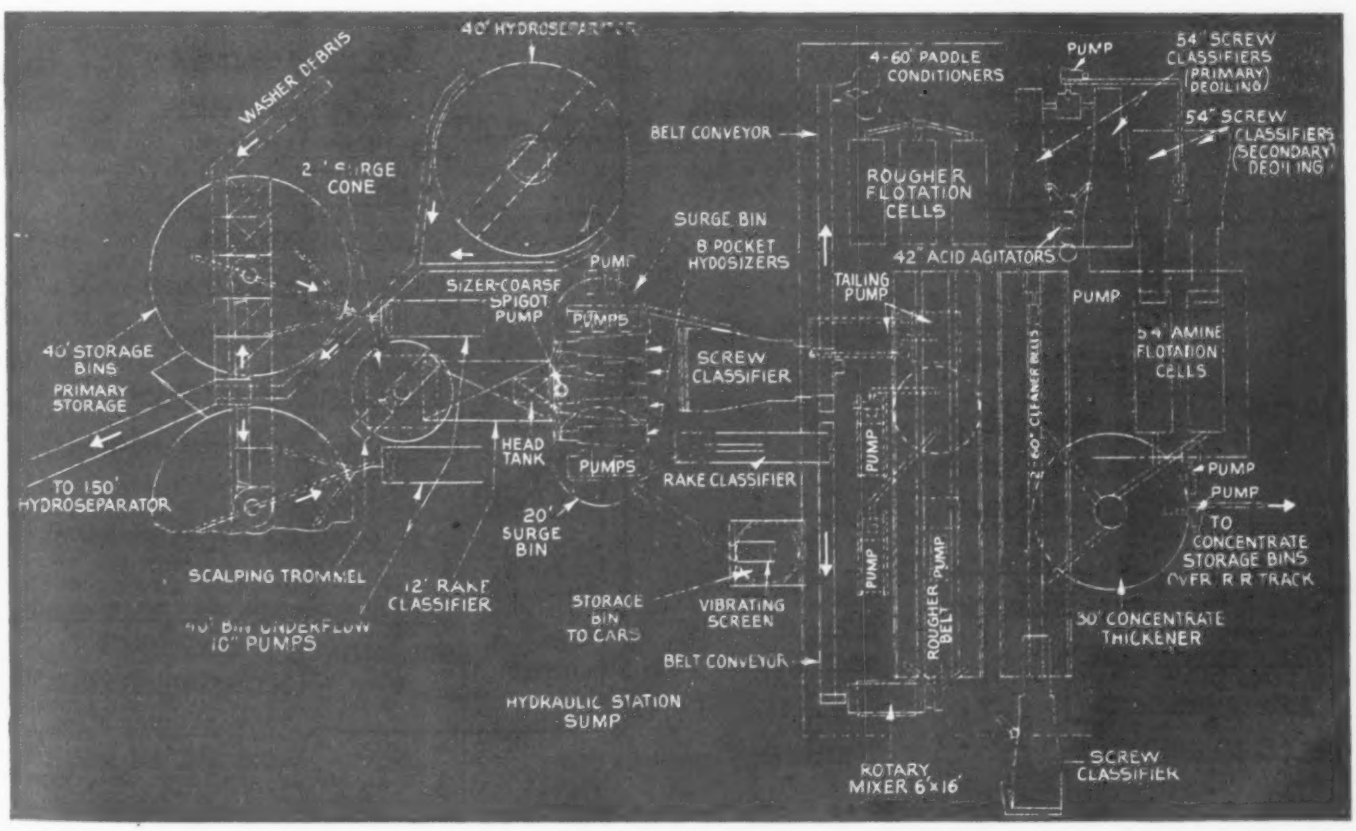
Belt concentrator units. Two 60-in. cleaner belts in foreground, and three 42-in. rougher belts in background with rotary mixer unit, top background

Introduction of the flotation process in the phosphate fields was brought about in the late twenties or early thirties. This process of beneficiation of ores had been previously used in the processing of metallic ores (since about 1906), and many of the patents relating to the process were owned by Minerals Separation North American Corporation, giving this company better than 40 years experience in flotation. Later when the process was being applied to the phosphate fields, Minerals Separation played a considerable part in the development program.

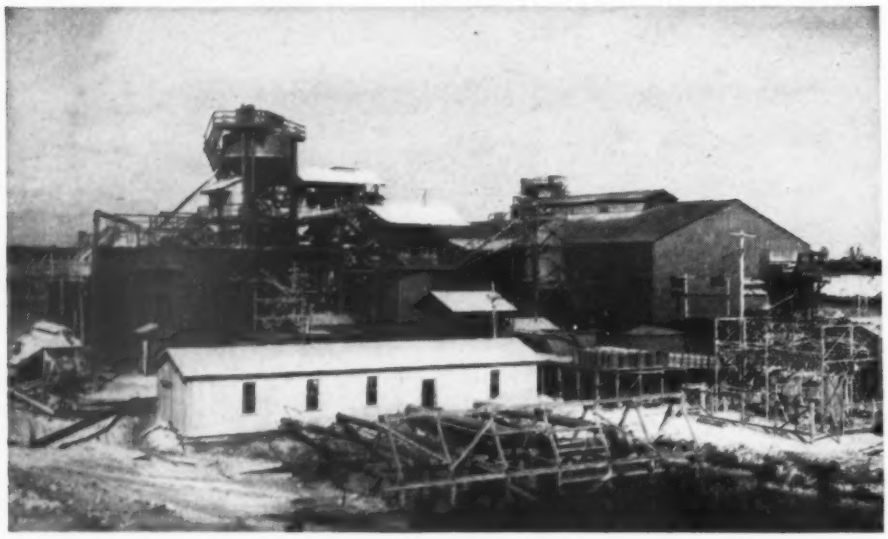
Minerals Separation North American Corporation was given the job of designing the flotation system in collaboration with the Coronet Phosphate Company's staff and the Eleanor plant is the result. The plant was built by Coronet with the cooperation of Western-Knapp Engineering Co. of San Francisco, California, with a wide experience in construction of various types of metallurgical plants. The designing was done under the direction and supervision of Dr. E. W. Greene and W. M. Houston of Minerals Separation, in consultation with R. M. Wilbur of the Coronet Phosphate Co.

We are indebted to J. R. Sheffield, president of Coronet Phosphate Company, and to B. G. Dabney, vice-president and general manager, for permission to inspect this interesting plant. We also wish to thank W. M. Houston, engineer, and Dr. E. W. Greene, resident manager for Minerals Separation North American Corporation for illustrations and flow diagrams of the Eleanor plant.

Mining practices at the Eleanor mine follow the general trend of the other producers in the area. Like the



Layout of Eleanor phosphate plant with flotation section to the right



Hydraulic station in foreground; plant in background

other producers, the mine is some distance from the drying and grinding plants. At Coronet the Coronet Phosphate Co. has a drying and high temperature calcination plant. Output of the Eleanor operation is shipped to Coronet by the Seaboard Air Line Railroad.

Re-use Large Volume of Water

At the Eleanor mine, retention of tailings from the plant and the recovery of the water and its re-use is no small part of the operation. Surrounding an area of about 320 acres is a high dike, built of more than two million cubic yards of barren overburden. All tailings from the plant and the overflow from the large 150-ft. General American thickener flow to this settling pond. Return waters go to the hydraulic station via a canal that is about 15 ft. wide. About 30,000 g.p.m. is used in the operation.

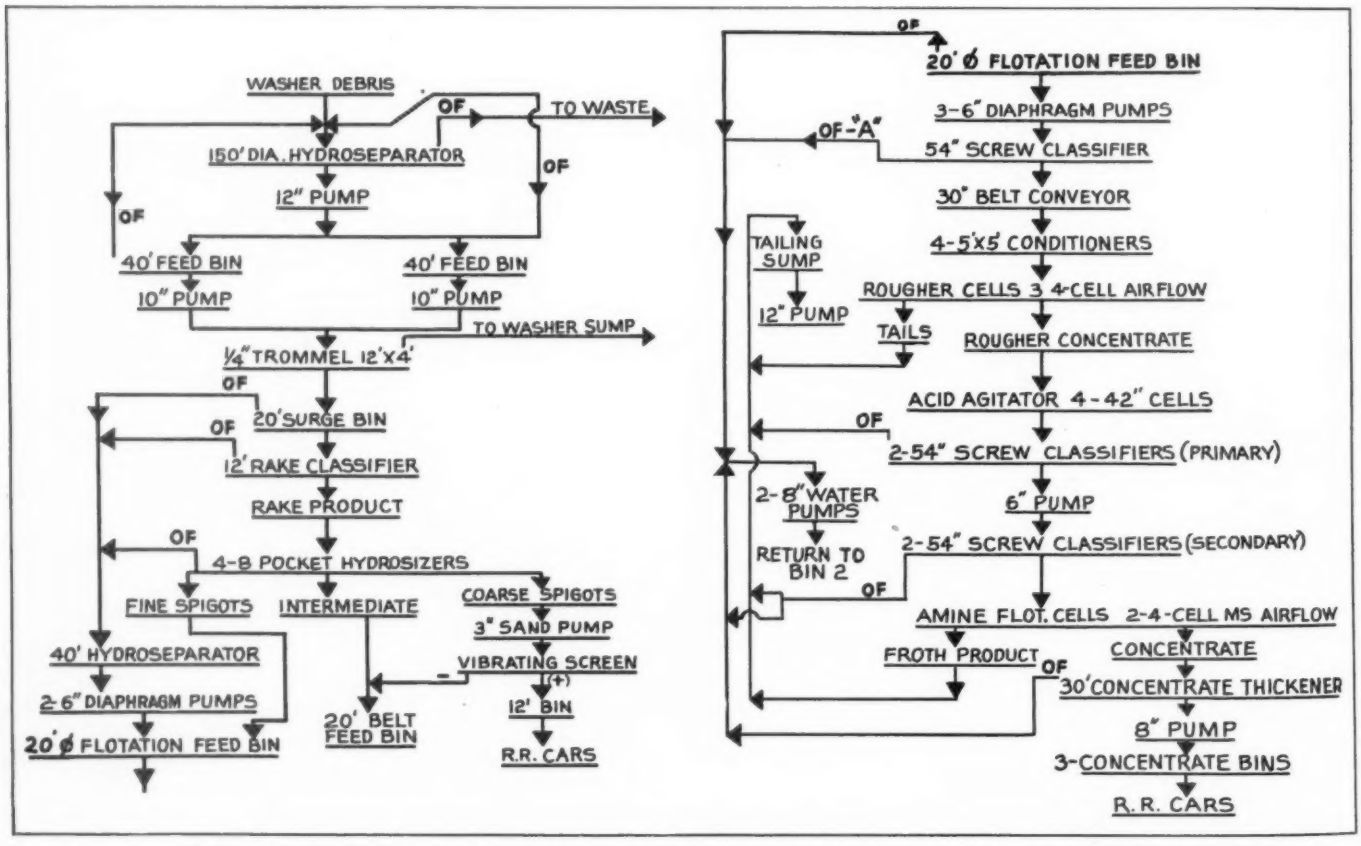
Most of the washer equipment, including storage bins, was moved from a previous operation at Hopewell to the Eleanor plant.

Classification and Dewatering

The recovery plant, which is noteworthy for its compactness and ease of supervision, is rated at 5,000 to 6,000 tons of prepared feed per 24-hr. day. Many of the thickeners, storage tanks, hydro-separators, spiral classifiers are out in the open but served by steel walkways and stairways. The walkway floors are of expanded metal grating. The buildings, all fireproof and of steel construction, are covered with corrugated iron sheeting.

Spiral classifiers are used extensively in the plant, and are all 54-in. dia. both simplex and duplex screw types. All six of these units were supplied by Western Machinery Co. In general, classification and dewatering in the plant is designed to deslime all flotation feeds, for minimum reagent consumption results.

Phosphate matrix is pumped from the mine to the washing plant where the plus .028-in. size is scrubbed, removed, and sent to the drying and grinding plant at Coronet. The so-called "washer debris," or minus .028-in. material, is flumed to the 150-ft. General American hydroseparator or thickener. This hydroseparator is center-driven with the stirring arm mechanism assembled in a pit excavated alongside the plant with access to the underflow area through the center torque tube. The overflow from the thickener goes to the settling pond, carrying the waste slimes which



Flowsheet of Eleanor plant with feed preparation section to the left, and minus 48-mesh flotation section, to the right

are minus 150 mesh and largely colloidal.

The underflow, picked up by a 12-in. Georgia Iron Works pump, with automatic Foxboro controls to provide for maximum solids content, is sent to two 40-ft. dia. steel primary storage bins. These two bins are located at an elevation high enough so that the overflow returns to the 150-ft. hydroseparator previously mentioned. The bins, besides acting as storage units, also serve as deslimers.

Storage bins and surge bins in the plant, following the general practice in the phosphate field, are filled by pumps with the overflow escaping through circular wiers at the top of the tank. They are emptied by water jets in the bottom and/or in the outlet pipes that flush the stored material to the discharge pump. At the Coronet plant each of these storage tanks is emptied through one of two 10-in. G.I.W. pumps that deliver to a 4- x 12-ft. G.I.W., trash trommel with ¼-in. punched metal. The plus ¼-in. material is returned to the washer. As the trash trommel is high enough in the plant structure, the minus ¼-in. flows to a hoppered bottom, steel, 20-ft. dia. surge bin mounted above a 12-ft. Dorr QSFX rake classifier. Fines overflowing from this surge bin become part of the flotation feed comprising the minus 48-mesh material which will be described in detail later while underflow drops to the 12-ft. Dorr classifier.

The rake product from the 12-ft. Dorr classifier passes directly to four 8-pocket General American hydrosizers that operate in parallel. These sizers are provided with Bristol air controls. With these air-controlled sizers, variations in density of bed in the pockets are translated into variations in air pressure which, in turn, result in the mechanical operation of spigot valves which reduce or increase the discharges from the various pockets.

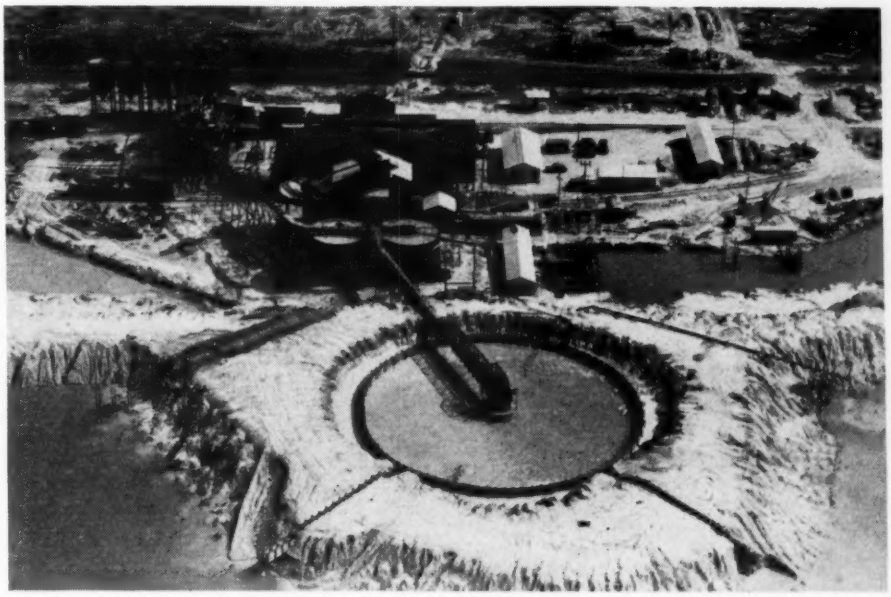
The eight spigot outlets on each sizer are grouped to give three sizes of material: The spigots near the inlet are combined to give a coarse product; the spigots in the middle section give an intermediate product; and the spigots near the outlet give a fine size that becomes a part of the minus 48-mesh flotation circuit. This type of sizer is finding an extended use in the sand and gravel industry for the classification of sands, and there are many applications in the silica industry where an accurately sized feed is desired ahead of table or other gravimetric concentrators.

The screen analysis of the spigot discharges is about as shown in the accompanying table.

Material from the feed end of the sizer (coarse material) is sent to a 4-in. G.I.W. sand pump that delivers to two dewatering Link-Belt backing-up screens. The oversize of commercial grade without further treatment falls to a 12-ft dia. bin, and is loaded to open-top hopper cars for shipment to Coronet. The undersize material from the vibrating screens goes to the 20-ft. dia. x 28-ft. high steel "Belt Feed Bin." This is the bin that supplies the belt flotation section. The intermediate size from the middle group of spigots on the hydrosizers flows to this same bin.

Fine sizes from the spigot classifier go to a 20-ft. dia. x 28-ft. high, steel, flotation feed surge bin. This bin handles the minus 48-mesh material.

Going back to the 12-ft. Dorr QSFX



Aerial view of plant showing 150-hydroseparator in foreground

TYPICAL PLANT RESULT SIZER SECTION
CUM. % WT.

Mesh	Rake Product (Feed to Sizers)	Coarse Spigots (Feed to Car Products Screen)	Intermediate Spigots (Feed to Belt Section)	Fine Spigots (Feed to Flotation Section)
+14	1.6	27.5	1.7	—
20	6.4	71.4	5.8	—
28	13.2	95.8	20.7	.6
35	22.4	99.6	39.7	2.1
48	38.1	100.0	62.3	9.3
65	65.9	—	85.9	40.6
100	90.4	—	97.5	77.2
150	96.4	—	100.0	93.6
—150	100.0	—	—	100.0

AVERAGE OPERATION OF THE ELEANOR PLANT FOR A TYPICAL MONTH*

BELT OPERATION

PRODUCTS	% Wt.	T.P.H.	% BPL	% Insol. Avg.	% Insol. Range	% BPL Recovery Avg.
Feed	100.0	78	52.8	—		100.0
Concentrate	64.5	50	74.9	3.0	2.6–4.1	91.6
Tailing	35.5	28	12.6	—		8.4

REAGENT CONSUMPTION

Pounds per ton at Belt Feed.
Fuel oil —4.9
Tall oil —1.6
Caustic soda— .67

CELL OPERATION

PRODUCTS	% Wt.	T.P.H.	% BPL	% Insol. Avg.	% Insol. Range	% BPL Recovery Avg.
Feed	100.0	138	42.4	—		100.0
Cleaner Conc.	49.6	68	74.1	3.2	2.2–4.6	87.3
Total Reject	50.4	70	10.7			12.7
Rougher Conc.	62.5	86	62.9			92.8
Rougher Tail	37.5	52	8.2			7.2
Sand Float	12.9	18	18.0			5.5

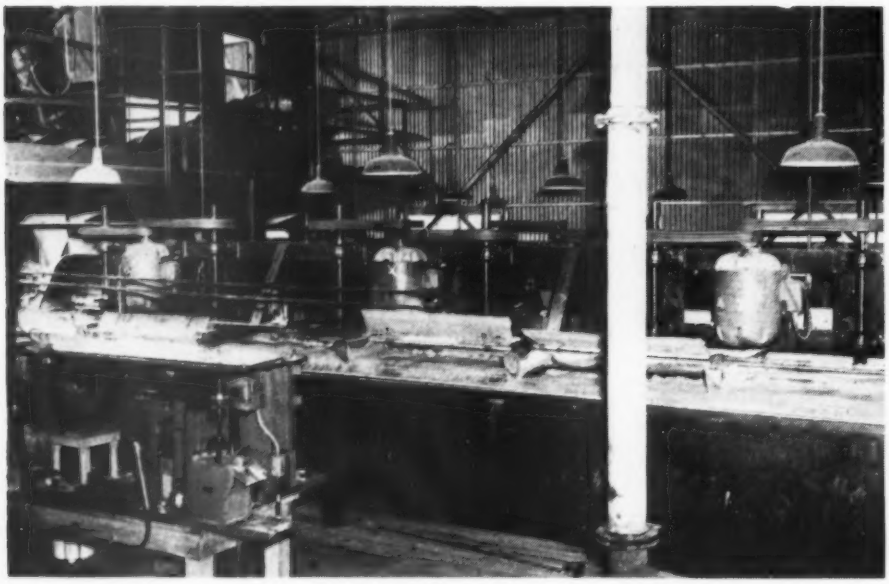
REAGENT CONSUMPTION

Pounds per ton of Cell Feed
Fatty Acid Circuit
Fuel oil —3.4
Tall oil —0.90
Caustic soda—0.67

DEOILING AND SAND FLOAT CIRCUIT

Sulfuric Acid—2.4
Amine —0.15
Caustic Soda—0.07
Kerosene —0.36
Pine Oil —0.04

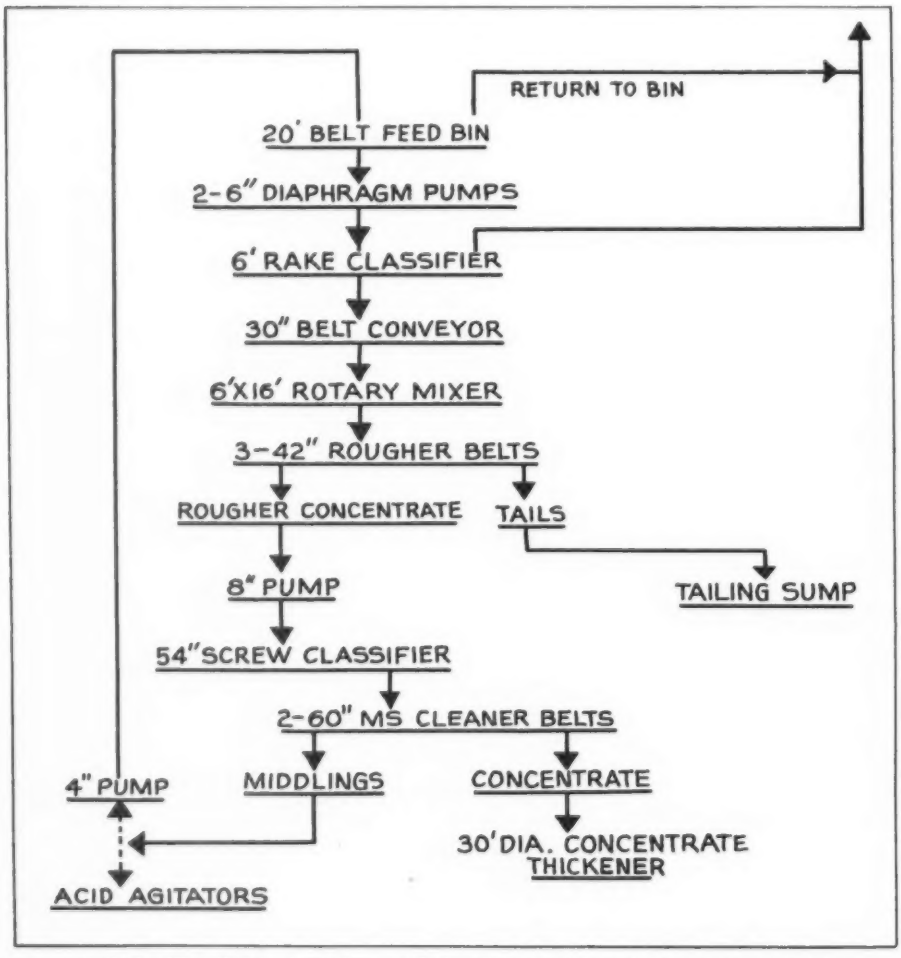
*The belt middlings were going to the deoiling and sand flotation circuit. It was impossible to account for this in the calculations.



Flotation machine section. Note laboratory flotation machine on bench in foreground

rake classifier; the overflow from this unit, joins the overflows from the 20-ft. surge bin ahead of it, and the overflow from the four General American hydrosizers and the combined overflow products pass to a 40-ft. Dorrco hydroseparator that uses two 6-in. duplex Denver Equipment Co. diaphragm pumps that deliver the underflow to the previously mentioned 20-ft. fine flotation feed bin. The 40-ft. hydroseparator acts as a thickener and deslimer of the minus 48-mesh materials in these various overflow products.

The intermediate size from the hydrosizers might be classed in the minus 14-mesh, plus 48-mesh range, and the finer sizes in the minus 48-mesh, plus 200-mesh range. The former size (minus 14, plus 48) is the belt separator machine feed and the latter becomes the feed to the Mineral Separation No. 8 Airflow flotation machines that are set up for both fatty acid and amine circuits. The latter bank of cells are so hooked up that they can be used as cleaners with fatty acid reagents but for the most part they follow the pattern indicated in the flowsheet.



Belt-classifier flowsheet section which handles plus 48-mesh phosphate materials

Belt Separator Section

Materials that go to the 20-ft. feed bin for the belt separator section are, for the most part, in the form of a pulp, and the overflow from the bin goes back to one of the two 40-ft. dia. feed bins in the feed preparation section. A battery of two 8-in. Buffalo water pumps handle this load as well as the overflow from several units in the minus 48-mesh flotation preparation section. The underflow from the 20-ft. feed bin is picked up by two 6-in. duplex Denver diaphragm pumps that deliver to a Dorr 6-ft. DSFX rake classifier. Overflow from the Dorr goes to the two 8-in. Buffalo pumps. The rake product falls to an inclined, 30-in. belt conveyor that delivers the material to a 6- x 16-ft. Maddox Foundry & Machine Works rotary mixer. This is a revolving, horizontal drum that is provided with suitable lifter baffles, and into it are fed the fatty acid, fuel oil, and caustic soda reagents. The agitation within is quite violent. The material from this conditioner is split into three equal portions and each portion flows to a 42-in. Minerals Separation rougher belt. These belts are each about 74 ft. long, and are parallel to each other. These belts produce a rougher concentrate and a tailing.

Reagent feeders are of the adjustable stroke piston pump type, and the coarse or belt feed is conditioned in a drum type conditioner (previously mentioned) whereas the fine or flotation cell feed is conditioned in agitator type conditioners.

The rougher concentrate is picked up by a pump, and sent to a 54-in. Western Machinery Co. Simplex screw classifier. This acts to de-water the rougher concentrate. The dewatered product then flows to two 60-in. wide Minerals Separation belt separator units that act as cleaners. They work in parallel and produce a concentrate and a middling. The concentrate is sent to the concentrate thickener, and then pumped to storage bins. The middlings flow by gravity either to a 4-in. Georgia Iron Works pump that returns the material to the 20-ft. dia. feed tank, or they flow to the acid treating agitators ahead of the sand flotation section handling the minus 48-mesh materials.

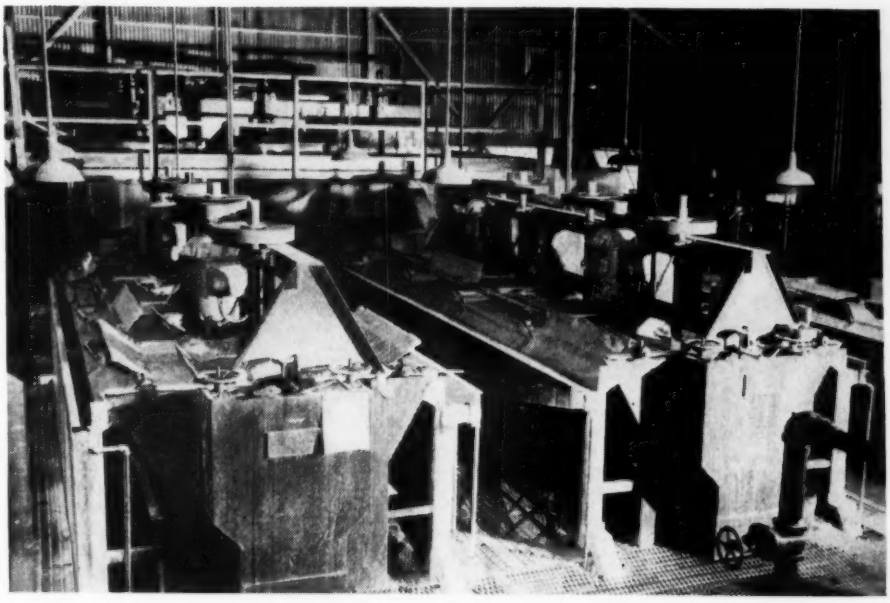
Flotation Cell Section

Treatment of the minus 48-mesh material consists essentially of Wemco dewatering spiral classifiers followed by M.S. Airflow flotation units which first produce a rougher concentrate using the fatty acid flotation technique. This rougher concentrate is then acid-treated for deoiling, and rinsed twice in Wemco spirals. The sand is floated from it in MS Airflow cleaner cells using the amine technique. In this section are a total of 24 of the No. 8 MS Airflow flotation cells. These machines are self-aerating through hollow impeller shafts.

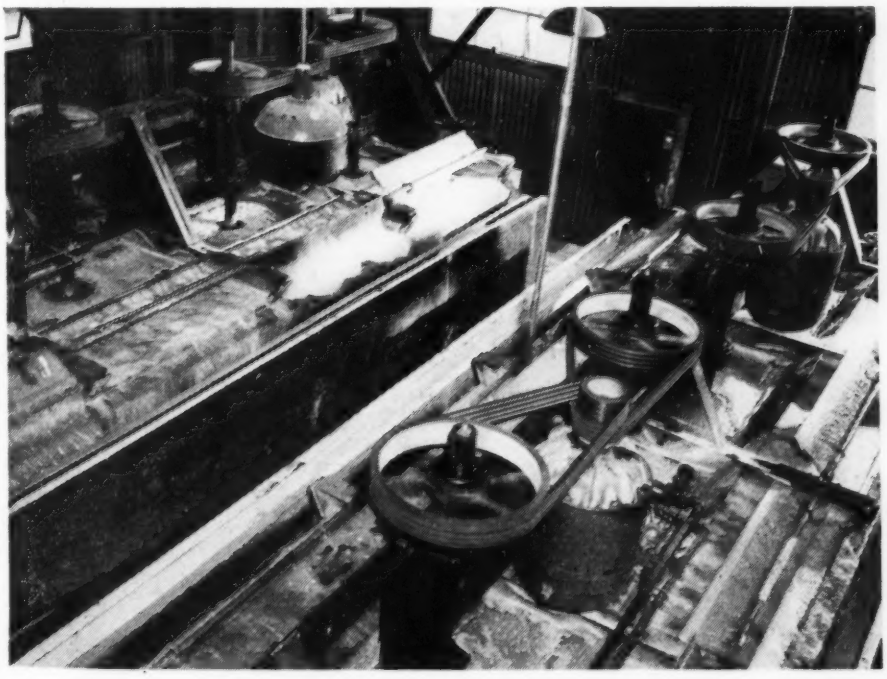
The flotation section operates as follows: The minus 48-in. material in the 20-ft. dia. flotation feed bin is recovered by three 6-in. Denver, duplex diaphragm pumps that deliver to a 54-in. Wemco duplex screw classifier. This spiral dewaters the flotation feed. The finer overflow is referred to as Overflow (A) in flowsheet. The coarse portion passes to four 5- x 5-ft. paddle-type, Denver conditioners. Here the fatty acid flotation reagents are added. These conditioners operate in series with the pulp from the fourth conditioner split three ways to three 4-cell banks of MS roughers. These are 54-in. No. 8 units. Here a rough concentrate and a tailing is made. The tails are pumped to the tailing pond by a 12-in. G.I.W. pump.

The rougher concentrate from this fatty acid circuit flows to four 42-in. acid agitators operating in series. The final treated product from the acid agitators is split equally to two 54-in. Wemco Simplex screw classifiers that operate in parallel with the overflow going to the 12-in. G.I.W. tailing pump. This is the first of the two so-called "rinsing steps." They function to prepare the pulp for the amine flotation circuit. The rougher concentrate from these first spirals is picked up by a 6-in. Wilfley pump and the product is split equally to the two 54-in. Wemco Simplex screw classifiers for a second rinsing. This overflow can go to the 12-in. tailing pump or be returned to the 28- x 40-ft. feed bins. The second bank of spirals delivers deoiled and rinsed rougher concentrates to two 6-cell banks of No. 8 MS (54-in.) Airflow machines. Here the amine reagents are added and function to produce a float product that is mostly silica. This sand float goes to the G.I.W. 12-in. tailings pump. The sink portion is near the phosphate concentrate, and it goes to the 30-ft. Dorr concentrate thickener which also receives the concentrates from the belt concentrator machines. This thickener is served by an 8-in. Wilfley pump that delivers the concentrates to four steel bins from which railroad cars are loaded.

The overflow from this thickener and overflow "A" are returned to the 40-ft. by 28-ft. high feed bins in the feed preparation section by the two previously mentioned 8-in. Buffalo water pumps.



Rougher flotation circuit; conditioners in background



Flotation cells, showing silica or amine circuit

Western Phosphate Production Needed

NEED for development of phosphate deposits in the West was stressed recently in a speech by G. Girard Davidson, Assistant Interior Department Secretary, who said that despite the fact that 60 percent of the nation's phosphate deposits are in four western states, only 8 percent of the phosphate mined in the United States during 1947, came from those four states. To date, Western farmers have been depending on the East for fertilizer supplies, paying as much as $60 per ton more than Eastern farmers pay for the same product. Not only will development of Western phosphate deposits meet the local farmers' needs for fertilizer, he said, but the Western phosphate beds are the only phosphate beds containing a number of critical minerals combined in the phosphate ore. Most important of these are vanadium, nickel, zinc, lead, and fluorine, offering the area possibilities of great wealth.

Open Sand and Gravel Plant

GREG AND JOE BOCK have set up a sand and gravel plant near Mucsocda, Wis., valued at more than $15,000.

RIP-RAP Stone Production

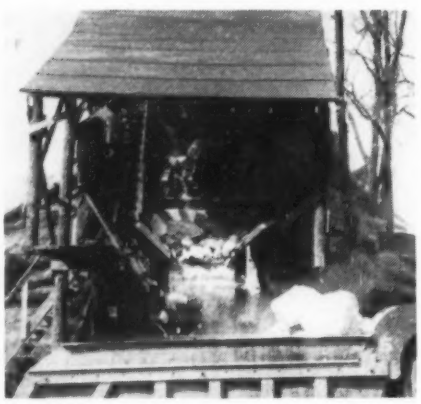
Requires Careful Sizing

Congaree Quarries, Inc., has contract for 800,000 tons of rip-rap and rubble stone

PRODUCING rip-rap and rubble stone involves special problems for the crushed stone producer which should make the operations of the Congaree Quarries, Inc., at Cayce, S. C., of particular interest. This quarry is on property leased from the Weston & Brooker Co. alongside its Cayce quarry. This rock is for the South Carolina Public Service Authority on the Santee-Cooper dam, about 100 miles down the Congaree river below Columbia, S. C., forming the Santee Reservoir and Lake Moultrie. The quarry is operated by Lambert Bros., Knoxville, Tenn., with Clay Lambert acting as local manager for the company.

The contract calls for the production of about 800,000 tons of rip-rap and rubble stone with Grannis, Thompson and Sweet Co. having the contract for placing the stone and for the delivery of the water-borne portion of the stone going to the dam. Mr. Craig Gaskell is project manager for the latter company. E. L. Goodwin is superintendent.

In most sections rip-rap refers to stone that weighs in the 5- to 15-ton range, but at this project the largest stone weighs 1300 lbs. with a 2- x 2-ft. cube considered about top size. The larger stone goes in the top section of the earthen walls of the dam, below this is placed stone weighing up to 300 lbs., and finally at the toe, stone from ¾-in. to 6-in. is spread.



Oversize from the vibrating grizzly will be shipped on barges down the Congaree river for rip rap stone

Thus the quarry producing this material only has the minus ¾-in. size as a by-product, the amount of this size produced being in the 2 percent range.

At present all shipments are going out by barge down the Congaree river. There are now in service 13 old LCT's (barges) that haul about 350 tons each, seven larger wooden barges holding about 700 tons, and 18 barges that handle around 150 tons each. Eight diesel-driven barges also are used, five of them being old C.M.'s. At present about 1500 to 1800 tons per day are being shipped. To augment this production a railroad spur is being built into the property and production will be increased about 50 percent. On the railroad loading section the stone will be crushed by a 42- x 48-in. jaw crusher set to produce an 18-in. stone. Throughs from the crusher will be processed somewhat along the lines of the little plant now in use and which is described here later.

Drilling and Blasting

Stripping operations cover an area of roughly 500- x 600-ft. using Garwood carryalls and tractors. Overburden of sandy clay varies from a few feet up to 12 and 15 ft. The underlaying granite is drilled with a battery of five Ingersoll-Rand wagon drills that drill rather shallow holes (15 ft. deep) Mr. Lambert explained that with the shallower hole it was possible to get a larger diameter at the bottom of the hole where the powder was needed. Holes, which collar at 3-in. and end at 2-in. diameter, are drilled on 6-ft. centers and 6-ft. burden. It is the practice to drill a considerable number of holes in a group and shoot them with either Atlas or Du Pont cap delays. The former are O-A and B and the latter No. 1-2-3. The operators are very much sold on the advantages of delayed blasting which gives the desirable fragmentation. A 60 per cent Austin powder is used. A shot of 250 holes is not uncommon.

Left: Loading a "pan" with 18 tons of rip rap

Right: Pan is swung over to the barge with a derrick

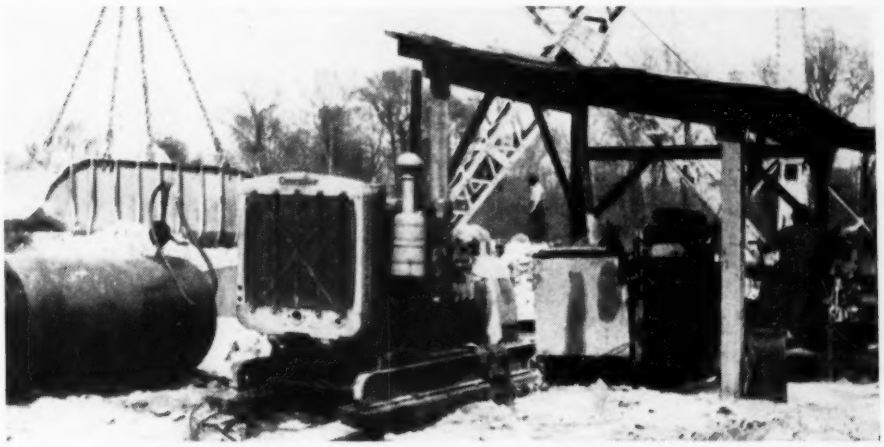
Sizing Operation

Broken stone in the quarry is loaded to 18-ton, rear-dump Euclid trucks by a 1¾-cu. yd. Lorain shovel with an Amsco bucket. Seven of these trucks are on the job. Rock is hauled up a short ramp to a comparatively simple sizing plant. The trucks dump to a 42-in. pan conveyor that serves a vibrating grizzly which has 6-in. openings. Oversize falls to a second pan conveyor of similar size. This second pan feeder is used to control the rate of feed to the Euclid truck that takes the large stone to the water loading dock. No separation is made here for the 300-lb. or larger stone previously mentioned.

Undersize from the grizzly falls to a 5- x 8-ft. double-deck Telsmith vibrating screen, operated dry. The lower deck has ¾-in. mesh, the top deck serving only to take some of the load off the lower. The oversize from the top of both decks falls to an inclined belt conveyor that discharges to a ground storage pile. This stone is for the toe of the dam. It is reclaimed to trucks by a conveyor belt operating in a short tunnel below. The fines fall to a second inclined belt and move to ground storage. As this pile builds up it is pushed out of the way by one of the several tractors and dozers on the job. A Cummins diesel drives a generator to supply the plant's electrical needs.

Stone is hauled about one-half mile to the Congaree river where the truck backs up a short ramp and dumps the load into a steel pan that holds the entire truck load. A stiff leg derrick lifts the pan and swings it out over one of the barges where the two front chains (one on each corner of the pan) are unhooked by a laborer and the load dumped. The stiff leg derrick has a 2-drum Ingersoll-Rand electric hoist to swing the boom. The load is lifted by an electric Lidgerwood hoist. A diesel-electric generating unit mounted on skids alongside the stiff leg supplies the electric energy for the unit. This derrick installation was necessary because the great variation in water levels on the Congaree river made it impractical to dump direct to barges. When barges are not available, or when river conditions are unfavorable the large sized stone is stockpiled at a point about midway between the plant and the docks. The trucks drive up to the top of the stockpile and dump and the rock is reclaimed by a second Lorain shovel. Three shovels are operated on the job. The stone is weighed on truck scales near the dock. At time of inspection the contract was about half completed.

All repairs are made at the quarry. Work is now underway on a new shop building, replacing the original shop which was recently destroyed by a fire.



A Diesel-electric unit supplies current for the barge loading section

P.C.A. Safety Trophy Winners

WINNERS in the 1947 Portland Cement Association Safety Trophy competition have been announced by PCA. Twenty-nine companies earned the Trophy award, and one company received Honorable Mention. Trophy winners are: Medusa Portland Cement Co., York, Penn., (grey); Medusa Portland Cement Co., York, Penn., (white); Alpha Portland Cement Co., Ironton, Ohio; Ash Grove Lime & Portland Cement Co., Louisville, Neb.; Marquette Cement Mfg. Co., Cape Girardeau, Mo.; Canada Cement Co., Ltd., Hull, Que.; Lone Star Cement Corp., New Orleans, La.; Lehigh Portland Cement Co., Sandts Eddy, Penn.; Lehigh Portland Cement Co., Union Bridge, Md.; Lone Star Cement Corp., Bonner Springs, Kan.; Pennsylvania-Dixie Cement Corp., Clinchfield, Ga.; Lone Star Cement Corp., Birmingham, Ala.; Ash Grove Lime & Portland Cement Co., Chanute, Kan.; Dewey Portland Cement Co., Davenport, Iowa; Lehigh Portland Cement Co., Fogelsville, Penn.; Universal Atlas Cement Co., Leeds, Ala.; Universal Atlas Cement Co., Northampton, Penn.; Lawrence Portland Cement Co., Northampton, Penn.; Medusa Portland Cement Co., Bay Bridge, Ohio; Nazareth Cement Co., Nazareth, Penn.; Bessemer Limestone & Cement Co., Bessemer, Penn.; Medusa Portland Cement Co., Dixon, Ill.; Southwestern Portland Cement Co., El Paso, Tex.; General (Trinity) Portland Cement Co., Houston, Tex.; Lawrence Portland Cement Co., Houston, Tex.; Lawrence Portland Cement Co., Thomaston, Me.; Pittsburgh Plate Glass Co., Zanesville, Ohio; Lehigh Portland Cement Co., Alsen, N. Y.; Riverside Cement Co., Oro Grande, Calif.; and Universal Atlas Cement Co., Osborn, Ohio. Lone Star Cement Corp., St. Stephens, Ala., (quarry) was given Honorable Mention.

View of quarry showing shovel loading quarry haulage unit

Colorado Cement Shortage

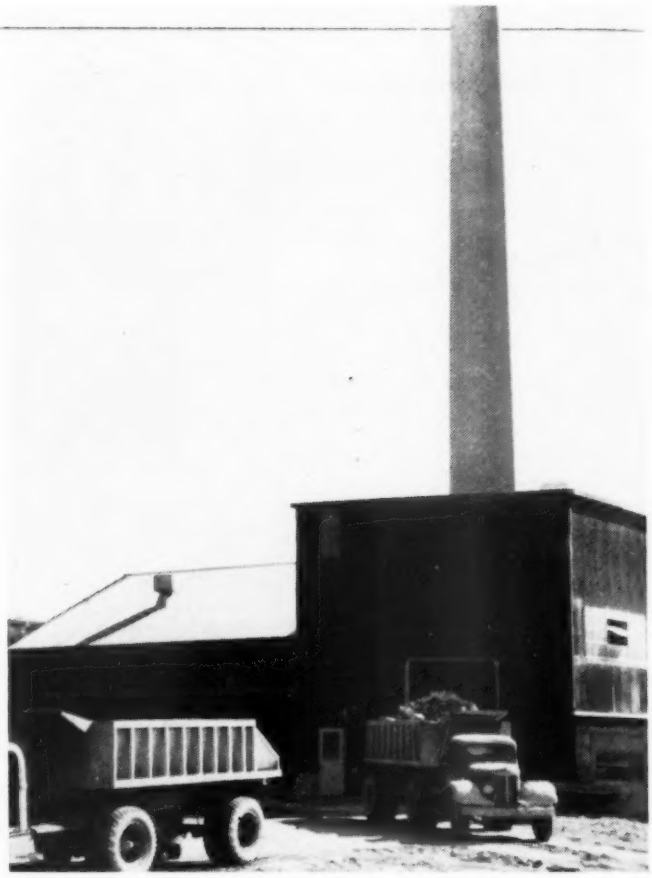
DESPITE increased production and construction of new plants, the cement shortage in Denver is expected to continue, representatives of two Colorado cement plants report. Demand for cement has tripled since 1942, while production has been increased only slightly during that time.

Colorado Portland Cement Co. has constructed a new plant at Portland, Colo., which will boost present production by 40 per cent. Monolith Cement Co. has increased production 10 per cent. Increased government orders and increased demands by private industry are largely responsible for the acute shortage, officials said.

Economical Operation and Uniform Kiln Feed with New Grinding System

Medusa Portland Cement Co., Dixon, Ill., completing a two-year rebuilding program

By BROR NORDBERG

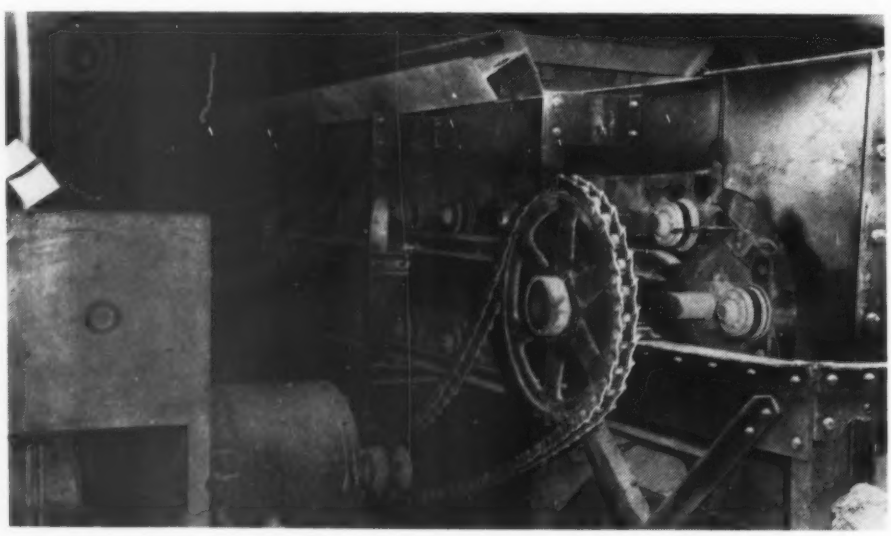


Looking toward new crushing plant. Trucks haul 12½ tons one mile from quarry

A TWO-YEAR rebuilding and modernization program was completed in August at the Dixon, Ill., plant of Medusa Portland Cement Co., comprising entirely new methods for the preparation of raw materials and their feed into the rotary kilns. New facilities include a crushing plant, raw materials storage, closed-circuit grinding, blending bins and a circulating system of kiln feed. Simultaneously with these improvements, the flues ahead of the waste heat boilers were rebuilt and re-arranged for more controlled distribution of the kiln exit gases to the boilers. Economy of operation and much more uniformity of kiln feed were the principal objectives of the new facilities.

The Dixon plant is dry process, operates six 8- x 100-ft. rotary kilns fired by unit coal pulverizers. Three waste heat boilers supply the steam for generating 25-cycle electrical current. No supplemental source of electrical power of that frequency is available so conservation of use in order to guarantee meeting peak demands is essential. Actual power input figures are not available yet but savings are substantial in comparing the new with the old system of grinding and handling. Connected horsepower in electric motors has been reduced by 445 hp. in comparing old and new requirements from the point of mill feed to kiln feed, due principally to the elimination of multiple pulverizing and grinding units and a complexity of conveyors and other handling equipment.

As shown in the accompanying plant layout drawing, an arrangement of crushing equipment, storage facilities, grinding equipment and blending bins was adopted that would be compact, straight line flow and eliminate cross-handling. To accomplish an economical layout, a complete new crushing plant and grinding mill building, with undercover storage for raw materials between were built, of concrete and steel construction. The old crushing plant was dismantled since it was considered obsolete and its location did not lend itself to the new flowsheet. The old mill building was scrapped entirely with its four rotary dryers for stone and clay, six hammermills, Peck carrier, conveyors, elevators, feeders, compartment mill, three mechanical air separators, fine materials pump and five tube mills.



This apron feeder regulates flow of stone into screw conveyor for feed to grinding circuit

Crushing Plant

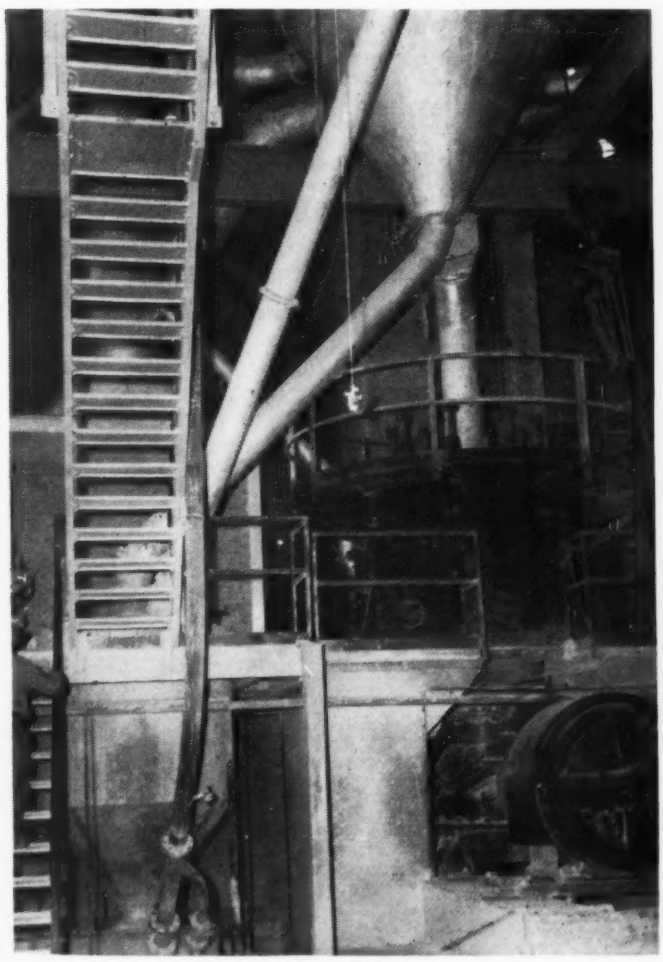
Kiln feed is a three component mix, consisting of limestone hauled one mile in 12½-ton trucks from the quarry, clay obtained from the overburden, and shale which is shipped to the plant by rail. The shale is lower in silica and iron but higher in alumina than the clay and must be crushed, whereas the clay requires no crushing. Each represents seven percent of the total raw mix.

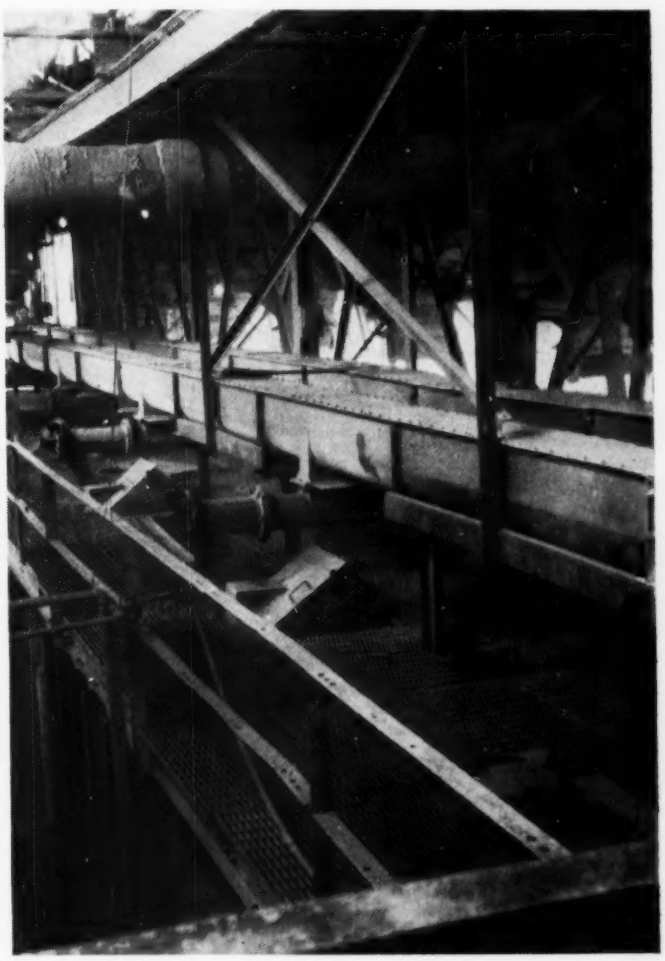
Crushing capacity is 250 t.p.h. of minus ¾-in. limestone. The plant is simplicity compared to the out-moded one. A 60-in. Allis-Chalmers apron feeder regulates the flow of stone from the truck hopper into a 48- x 60-in. Traylor Blake-type jaw crusher set for a reduction to 8-in. top size. A 48-in. Jeffrey apron feeder transfers the crusher output to an inclined

Jeffrey bucket elevator filling a 17-ton overhead bin from which a Pennsylvania impactor is fed. The latter machine is type C.F.1144, reversible, and is driven through V-belt by a 200-hp. motor. Feed into the mill is by a constant speed Jeffrey apron feeder and the discharged product is elevated and screened over a 6- x 12-ft. single-deck Tyrock screen carrying ¾-in. square mesh woven wire cloth. Throughs chute directly into the adjoining covered storage area and rejects are piped back into the impactor. A typical sample of the impactor product, after one month's operation, was 41.43 percent retained on the ¼-in. screen, 11.65 percent on the ½-in. and 1.77 percent on the 1-in. screen. Size of feed material as prepared for the grinding mill is therefore more than 88 percent smaller than ½ in. and it contains approximately 13 percent fines through 100-mesh. The same primary crusher saw service in the dismantled plant, where primary reduction was followed by reduction to 1½-in. top size through a large hammermill. The product was then put through rotary dryers and reduced to kiln feed sizes by a number of small hammermills.

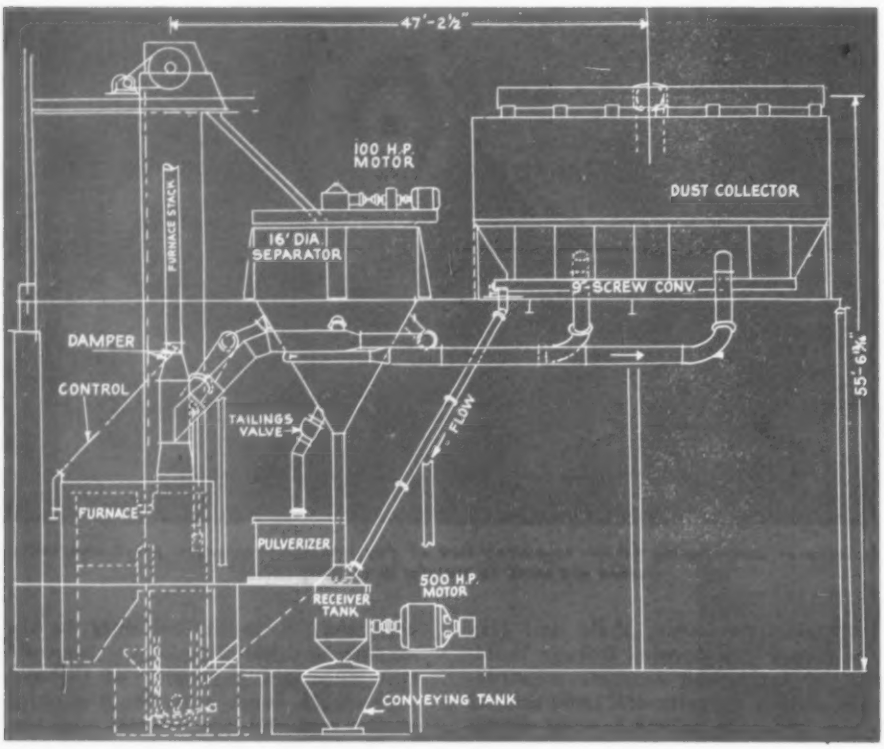
Close-up of proportioning feeder, regulating flow of clay into screw conveyor, which also carries stone and shale to elevator in grinding circuit

Crushed limestone, shale and clay are stored in a covered storage building, of reinforced concrete construction, with a capacity of 21,600 tons of stone, sufficient for 24 days of operation. The structure is similar to others in the portland cement industry except that it is limited only to the storage and handling of the separate raw materials. It consists of 17 bays, each 20 ft. long, of which the three at the east end are for clay and two at the west end for shale. A P&H overhead electric crane travelling on





Left: One of two identical pulverizing systems. Rejects from air separator drop through vertical pipe into pulverizer. Fines drop down inclined pipe to air activator conveyor which also receives fines from overhead dust collector. Stoker-fired air heater, lower right. Right: Kiln feed material is circulated through these conveyors from kiln feed to overflow bin at opposite side of building and return. Each horizontal conveyor, below, feeds a separate kiln

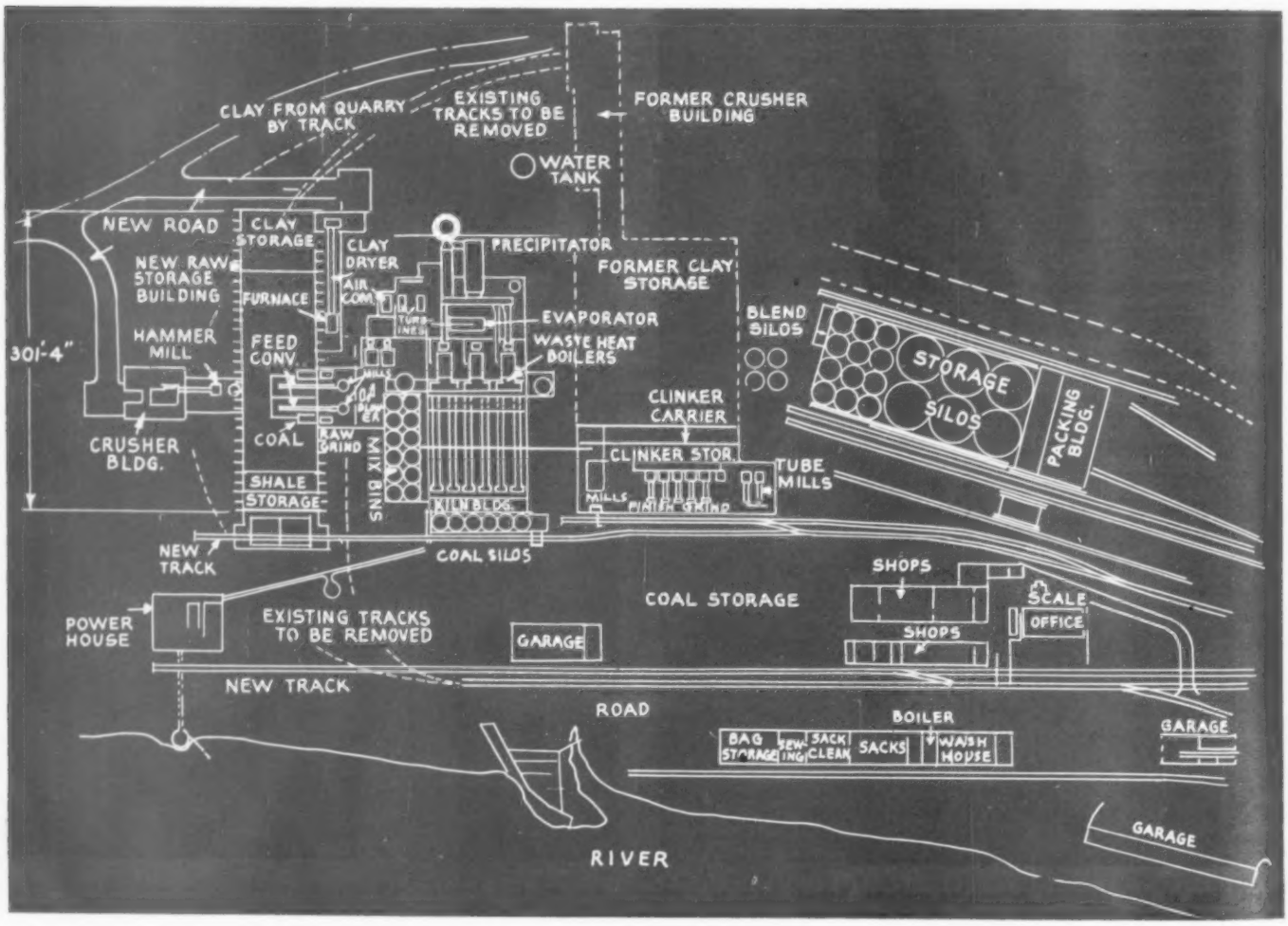


Elevation plan showing details of compact grinding system

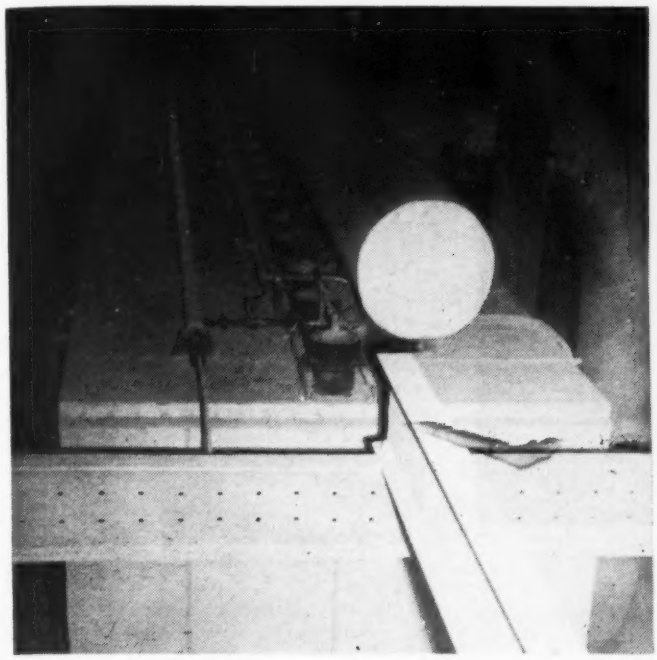
78-ft. 5½-in. centers, with 3-cu. yd. Owen bucket, handles the materials in storage.

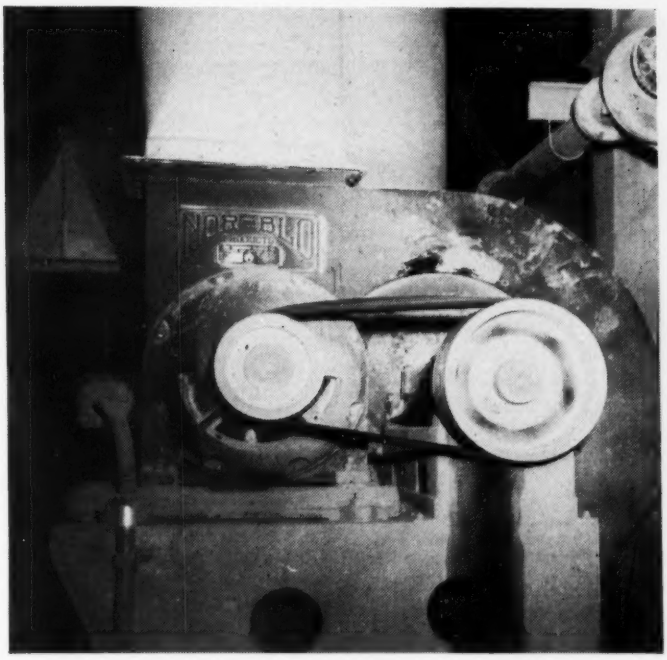
Shale is received in hoppered-bottom cars that dump into a shale pit at one end of the building. The design provides for transfer of the shale by the overhead crane into the main storage area but, temporarily, this material is being crushed through the stone crushing plant in roughly the required proportion as used. Intermixing of these materials is accomplished by rehandling in storage with the crane. There was little provision for blending of crusher-run materials in the old system.

Three of four rotary dryers were eliminated entirely with installation of grinding mills which dry the raw materials as they are ground but the fourth was retained and re-installed alongside the storage area wall near the east end to accomplish partial drying of the clay. All that is required is surface drying. Lumps are broken down in passage through the dryer so that the clay may be easily fed out to the grinding mills. A screw conveyor is the means of transfer into storage. The dryer is 6- x 85-ft. and is fired by an Iron Fireman stoker.



Layout of cement plant after rearranging crushing, grinding, and storage facilities





Left: One of two insulated bag-type dust collectors which vent grinding circuits. Dust is returned into finished product conveyor. Right: One of dust collector fans through which grinding circuit is maintained under suction

Proportioning-Grinding

Grinding of raw materials is accomplished by the two identical grinding circuits. Two rows of three feed bins for limestone, shale and clay, were provided in the storage building so that a common screw conveyor under each row of hoppers supplies proportioned raw materials into the boot of the bucket elevator whereby the materials enter each mill circuit. Flow of limestone from the hopper overhead is regulated by a Jeffrey apron feeder driven from a variable speed motor. Adjustments to the rate of feed into the grinding mill are made by changing the speed of the feeder drive, and by proportionate re-setting of Jeffrey Waytrol vibrating feeders which pay out desired weights of shale and clay into a common screw conveyor below.

Each of the two grinding circuits consists of a type B, size 366, B&W pulverizer in closed circuit with a 16-ft. Sturtevant mechanical air separator in a system supplied by heated air for drying while grinding and operated under slight suction for dust-free operation.

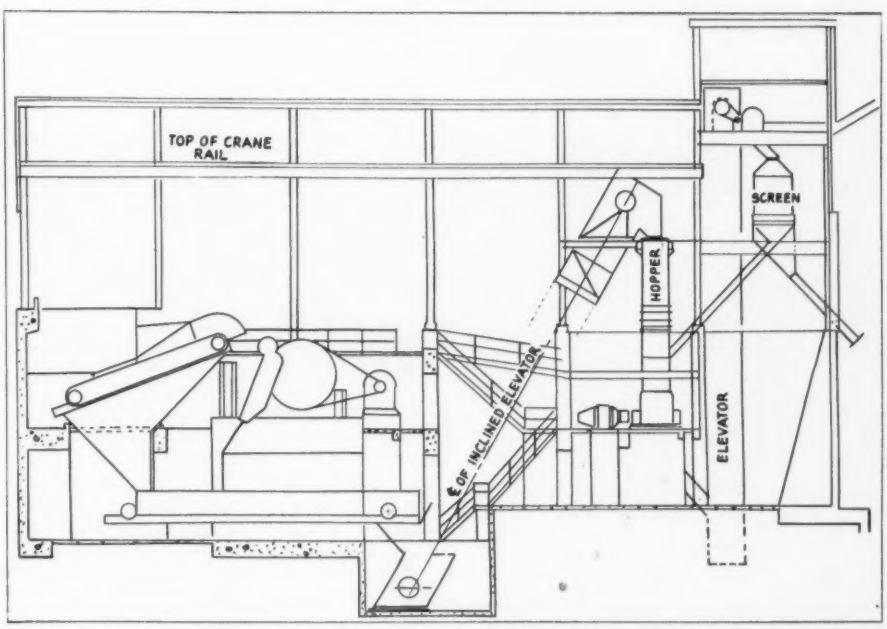
The work of both preliminary and finish grinding is accomplished by a single compact unit which, through the ball-bearing principle of pulverization, permits carrying a large circulating load simultaneously with maintenance of capacity output. Low power consumption and maintenance were factors in the selection of this system of grinding. Operating data based on long time performance are not yet available.

In grinding a three component mix of 74.2 average grindability (the limestone is 72), anticipated capacity per pulverizer is 38.9 t.p.h. (dry basis) of 92 percent minus 200-mesh product from a feed with ¾-in. maximum size, fed with 3.5 percent average moisture. Power consumption for the entire system of grinding including the pulverizer, elevator, air separator and auxiliary equipment is not expected to exceed 12.5 kw.h. per ton of product. A single unit operating at that capacity on a 24-hr. schedule will meet the requirements for 4-kiln plant operation.

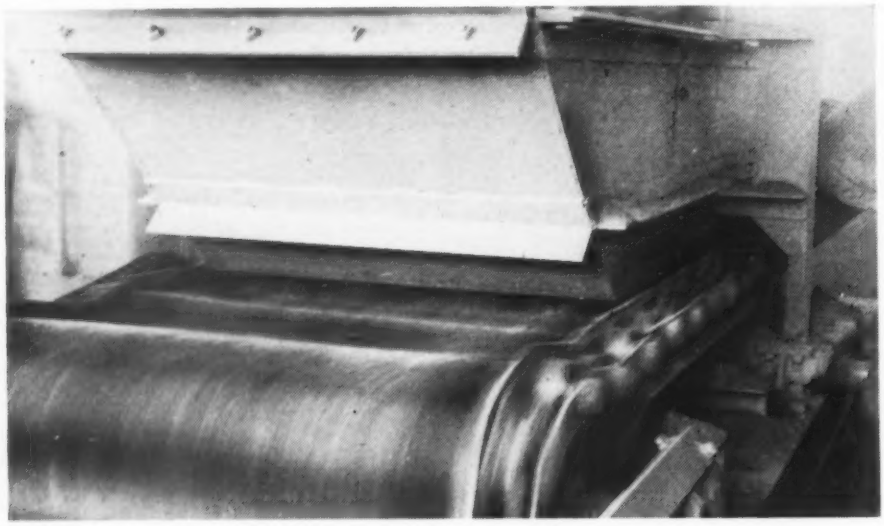
Proportioned material is delivered into an enclosed 65-ft. centers Link-Belt continuous bucket elevator of 250 t.p.h. rated capacity which delivers all the feed material into the mechanical air separator. Rejects from the air separator comprise the feed into the pulverizer which discharges by gravity into the same bucket elevator to complete a closed circuit. The fines are transported into blending bins by a Robinson air activator conveyor.

Each pulverizer is driven by a 500-hp. Allis Chalmers synchronous motor through an Ajax flexible coupling that is mounted directly on the mill shaft. The bucket elevator is concrete-encased and driven from a single reduction herringbone speed reducer direct-connected to a 35-hp. motor.

The air separator is driven by a



Showing layout of primary crusher followed by hammer mill



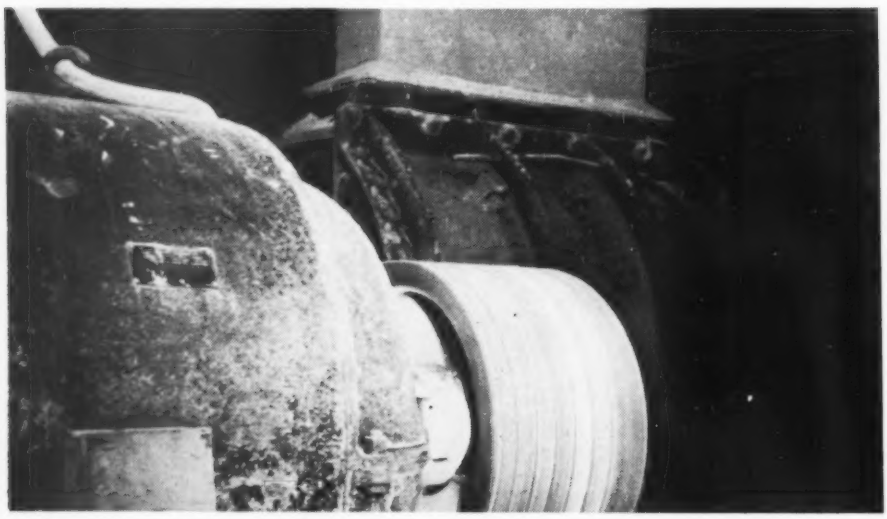
Apron feeder regulates flow of stone from surge bin to hammer type mill

gear reducer direct-connected to a 100-hp. motor and has special heavy-duty reinforcing lining plates and, as shown in the accompanying illustrations, is fitted for the introduction of heated air for drying.

Heated air is supplied the system by a hot air refractory furnace fired by an Iron Fireman pneumatic spreader-type stoker burning bituminous nut coal. The entire system is vented through an automatic Norblo bag-type dust arrestor of seven compartments, with 78 bags per compartment, and fitted with air shakers. The drive is a 50-hp. motor. Collecting screw conveyors (9 in.) discharge the dust via a spout into a 6-ft. diameter receiving tank serving the air-activated transport system. Product of the separator also discharges into the receiving tank. The activator is operated under a 30 p.s.i. pressure in the transport line to the blending bins.

The air separator, dust collector, piping from the furnace to the air separator and from the separator to the dust collector are insulated with cast-formed 85 percent magnesia block to thicknesses varying from 1½- to 2½-in. Heated air is drawn through the air separator by the dust collector fan, and the elevator and pulverizer are under slight suction. Exhaust temperature at the fan is not permitted to exceed 150 deg. F. and incoming air (60,000 c.f.m.) temperature to the air separator is limited to 1000 deg. F. maximum. Thermocouples at these points will stop the stoker if the set limiting temperatures are exceeded. Temperature of the fines as measured in the spout to the air conveyor receiving tank is limited to 150 deg. F.

A tailings valve operative through a solenoid switch will automatically close if the mill should stop because of overload or low voltage or other cause and, through interlocking, the feeders to the elevator will stop. The air separator has sufficient volume in that event to hold the load that would be in the elevator. A mill motor load of 125 amperes will cut the feed. The control factor on ciriculating load is the elevator drive ammeter. Judging from wear of the grinding balls and ball races as actually measured after two months' operation, continuous operation of the pulverizers for 14 months may be anticipated before the need for replacement of wearing parts.



Hammer type mill and its drive. This mill produces ¾-in. minus material for pulverizer feed

Blending

A new installation of blending bins and a circulating system of kiln feed have proven effective in the attainment of much more uniform composition of raw materials and greater regularity of flow through the kilns than was possible hitherto. Twelve blending bins are arranged in two parallel rows of six. Each bin is 16-ft. diameter, 52 ft. high, and holds 1045 bbl. of pulverized raw materials. Storage thus provided is 12,500 bbl. in steel bins that formerly comprised storage for finished cement.

Fuller valves on the transport line from the pulverizers are the means of selection in filling the bins, and blending is accomplished by drawoff from a minimum of three or four bins simultaneously in transferring to a kiln feed bin of 500 bbl. capacity. Screw conveyors and bucket elevators are used throughout the system and for kiln feed as well. Medusa has experimented with variations of this system of blending and circulating kiln feed in others of its mills and the Dixon installation has been perfected as the result of experience with earlier installations.

The two rows of blending bins parallel the kilns, and the kiln feed bin is located at the east end of the bins at the longitudinal center line between them for convenience in receiving material drawn from bins in both rows. Its position is just off the kiln room (north) at the feed end of the building and there is an identical overflow bin at the opposite side of the kiln room. Operation of the feed system is tied electrically to the drawoff of materials from the blending bins.

Each bin has a star-type feeder driven from a chain and sprocket connection to a single line shaft, and under each row of bins is a single 16-in. screw conveyor to carry the material from any combination of six bins toward the kiln feed bin. One of the two conveyors discharges into the boot of a bucket elevator located to one side of the kiln feed tank, with a cross 16-in. screw conveyor transferring from the second long conveyor to the elevator. A second elevator on the opposite side of the bin is the means for transfer of kiln feed material from the feed bin into an overhead 16-in. screw conveyor spanning the kiln feed floor and terminating at the duplicate bin. The first elevator transfers material from the blending bins into the same conveyor which has a slide opening in the housing in order to fill the kiln feed bin. By closing that

outlet, this elevator could in emergency function to supply the kilns direct.

The blending system provides for the intermixing of dust as recovered from the kiln exhaust gases, into the raw materials. Dust from the electrical precipitator at the stack is pumped through a 3-in. line into a dust bin located between four of the blending bins. This bin has the same type feeder as the others, paying out dust to the 16-in. cross screw conveyor delivering raw material to the kiln feed bin. Its drive is interlocked electrically with those on the line shafts from which the other bins feeders are driven.

Another source of dust for interblending is the boiler flues. In rebuilding the flues, a common flue was dismantled and new ones installed, sectioned so that each of three boiler flues will receive the gases from a pair of kilns. Dust settled in one flue is conveyed by screw conveyor to the elevator filling the kiln feed bin; from the other two, to an elevator at the opposite side of the kiln feed floor filling the duplicate "overflow" bin.

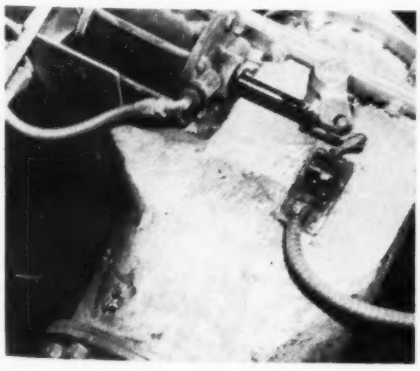
There are four outlets under the kiln feed tank, each with a rotary bin feeder, and 14-in. screw conveyors deliver to an elevator for transfer into the previously-mentioned 16-in. screw conveyor spanning the kiln feed floor. The feeders will release sufficient feed for the kilns with an excess of 20 percent material to be conveyed over the kilns into the second bin. On the latter bin there are three feeders which pay out to an elevator for transfer into a second overhead 16-in. screw conveyor paralleling the other and returning material back into the kiln feed bin at the opposite side of the building. Thus, when the kilns are being fed there is an aerated flow of material constantly through the two screw conveyors but in opposite directions. Cross screw conveyors cut under both the main conveyors over each kiln and discharge into their respective kiln feed spouts. These conveyors differ from the others in that the spiral turns in a 9-in. constant diameter pipe which flows full and thereby delivers a uniform amount of material per revolution. At present, two of these conveyors have individual drives; the others are driven by chain and sprocket from a line shaft on the kiln drives.

Both 500 bbl. bins have high and low Bin-dicators for level control, 5 ft. from the top and 10 ft. from the top, which control the flow of material to hold the depth inside each bin within these limits. When the kiln feed tank is filled to the 5-ft. level, the main shafts from which the blending bin feeders are driven automatically stop. With a drop to the 10-ft. level, the feeders automatically start again. Through interlocking, the dust bin feeder stops and starts accordingly.

At the opposite bin, one of the three drawoff feeders is open all the time in order to dispose of hot flue dusts and distribute them in the circuit. When the bin is filled to the 5-ft. level from the top, the other two feeders cut in and, with a drop of 5 ft. in level, cut out again.

With this system, the conveyor transporting kiln feed material from the feed bin over toward the second bin carries sufficient material to feed the kilns simultaneously but, should a kiln be starved say at the far end, sufficient additional material will be bled from the return conveyor to fill the 9-in. kiln feed screw.

The plant has two 923-hp. waste heat boilers and one of 1138 hp., which must develop sufficient electrical power for all plant requirements.



Air valve actuated by solenoid to stop feed of rejects into pulverizer when over-load occurs

TRENDS IN GYPSUM

THE GYPSUM BOARD industry as of July, 1947, was composed of 10 companies making various types of board and, in most cases, producing building and industrial plasters and gypsum specialty products such as partition tile, plank and cast forms for use in building and construction, according to a new publication entitled *Gypsum Board Trends*, prepared by the Construction Division of the Department of Commerce.

In describing recent shipments and capacity, the report stated that actual shipments in the first six months of 1947 amounted to 1.8 billion sq. ft. or an annual rate of 3.6 billion ft. for all types of board combined. Also, the estimate of possible lath shipments, 1.7 billion sq. ft., exceeds the annual rate of lath shipments even in the first and second quarters of 1947 when lath shipments were higher than at any time since 1941.

Gypsum board shipments of all types amounted to 2.777 billion sq. ft. in 1941, consisting of sales of 1.8 billion sq. ft. of lath, 0.8 billion sq. ft. of wallboard and 0.2 billion sq. ft. of sheathing—this combination is considered to be equivalent to 3.25 billion sq. ft. of ⅜-in. lath.

Exact capacity of board machines currently in operation was not yet available at the time the report was published, although the practical capacity was determined from shipments of the industry in 1946. Almost 3.150 billion sq. ft. of board were sold, of which approximately 1.150 billion sq. ft., or 36.5 per cent consisted of lath. By May, 1948, it is expected that 40 plants operating at least 42 board machines will be running at capacity, their estimated capacity probably being in excess of 4.5 billion sq. ft. representing a major change from the situation at the end of 1941 when 34 plants and 36 machines were in operation.

An enormous demand for housing and a shift in demand from established eastern centers to rapidly growing areas of the Southwest and Pacific Coast have stimulated the industry to expand at an unprecedented rate. New construction in 1947 is expected to require 2.6 billion sq. ft. of gypsum board, including 1.0 billion sq. ft. of lath.

Three of the largest plants, curtailed during the war, have been restored to full operation, four new plants are under construction and are expected to start operating by winter, and two plants, which had not been in production for many years, have been taken over by other operators.

The second largest company in the business is making considerable additions to East Coast capacity by erection of a 6 million dollar plant in Baltimore with rated capacity 25 per cent greater than the existing plant at Bronx, N. Y. Expansions also are being made at the company's other plants at Savannah, Ga.; Niles, Ohio; Clarence Center, N. Y.; and Rotan, Texas. The largest company in the industry is erecting a new plant in Norfolk, Va., and building a new board machine plant at Sigurd, Utah. Facilities have been reconstructed at Plaster City, and Long Beach, Calif., and many other places. These additions to plant capacities should make possible production of more than 4.5 billion sq. ft. of board per year with lath accounting for from 40 to 50 per cent of total output.

Silica Deposit Found

A LARGE DEPOSIT of white amorphous silica has been discovered near Rogers, Ark., it is reported. Tests made by Midwest Research Institute of Kansas City, Mo., show the material to be 99.7 per cent pure colloidal silica with small percentages of iron, calcium and magnesium. A shaft is underway and shipment of crude material is expected to begin as soon as the mine can be opened.

To the extreme left can be seen dragline loading swing belt hopper while slack line cableway is being relocated. Next, 400 ft. conveyor to transfer point, at which pit run material is conveyed under tracks to primary crusher, behind plant. Pipe discharge to pit is overflow from mason sand hopper in plant, foreground. To the right may be seen overflow from sand drag. Note conical pile under homemade sand settling tank midway from plant to abondoned pit, right

PROCESS GRAVEL

To Meet Specifications of Two States

Slackline, swing conveyor combination reclaims sand, gravel at plant No. 1 of Standard Materials Corp., Clinton, Ind.

By DAVID MOCINE

WITH customers requiring a wide variety of aggregate sizes as well as varying percentages of natural to crushed gravel, the Standard Materials Corp., Clinton, Ind., opened a new pit, known as Plant No. 1, less than 10 miles from the Illinois border. Originally started in 1914, the plant was purchased by the present owners in 1934. A year ago the pit on the west side of the plant was abandoned. It had been operated with a 2-cu. yd. bucket on a tautline cableway, excavating a 60-ft. bank, about half of which was under water.

Material in the newly opened pit on the east side of the plant is being excavated to a depth of 25-ft. with a Sauerman slackline cableway, using a 2-cu. yd. bottomless bucket. The hoist for the slackline is powered by a 75 hp., 220-volt motor. It is planned to re-work the present pit to a greater depth at some time in the future.

Located approximately one half mile from the Wabash river, this deposit is extremely uniform as to gravel size, nearly all of which is minus 4-in., with an average of 60

During time slackline is down, the ¾-cu. yd. dragline charges hopper over end of swing conveyor. In background is slackline tower directly behind 8-cu. yd. hopper over 400 ft. conveyor to plant

Self-powered, rubber mounted bucket loader of 3 to 4 cu. yd. per min. capacity.

percent retained on 3/16-in. mesh. Capacity of the plant is 1600 tons per day of all sizes of sand and gravel; roughly in the percentage of five parts gravel to three parts sand. The company has an option on 60 acres immediately south of the plant. Having tested the deposit both to the south and north, it has been determined that the better material lies to the south, as the formation to the north contains too many fines.

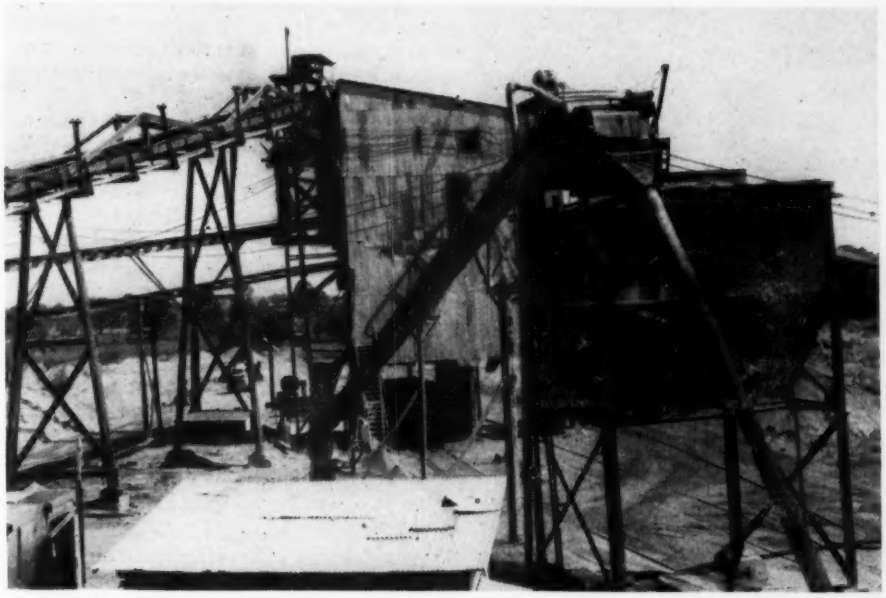
A hopper feeding a 30-in. swinging belt conveyor, extending 400-ft. south of the plant at the present time, is loaded by the cableway bucket. When it is necessary to move the cableway hoist, a ¾-cu. yd. P & H crawler-mounted Diesel dragline charges the hopper over the end of the belt during moving time to keep the plant operating continuously. Feed from the 8-cu. yd. hopper to the swinging belt is controlled by a manually operated gate. Pit material discharged from the swing-belt conveyor falls over an 8-in. grizzly built of heavy steel rails which also permits truck dumping in case of any pit equipment break-down, or if at any time additional fines from the north end of the deposit are required.

Screening and Crushing

A collecting hopper under the grizzly feeds to a 24-in. belt conveyor, 200 ft. centers, that inclines up through a tunnel under the railroad siding to the primary crusher. Discharge from the transfer belt falls to a 3- x 6-ft. Simplicity scalping screen with 1¼-in. screen cloth on the single deck. Throughs by-pass the primary crusher; while oversize, plus 1¼-in., falls to a 10- x 36-in. Cedarapids jaw crusher set for 1½-in. opening, and powered by a 40 hp. motor.

An alternate flow is provided at this point by an 18-in. transfer belt that can be lowered by means of a hand winch to receive oversize from the scalping screen, plus 1¼-in. This 10 ft. conveyor, powered by an electric motor mounted on the conveyor frame as an integral part of the unit, conveys the material to a 3- x 5-ft. grizzly with 2-in. openings. Throughs, minus 2-in., plus 1¼-in., fall to a short belt which discharges to an 8-cu. yd. truck hopper. This material is sold as gravel for county and private road maintenance purposes. Oversize on the grizzly is returned to the crusher.

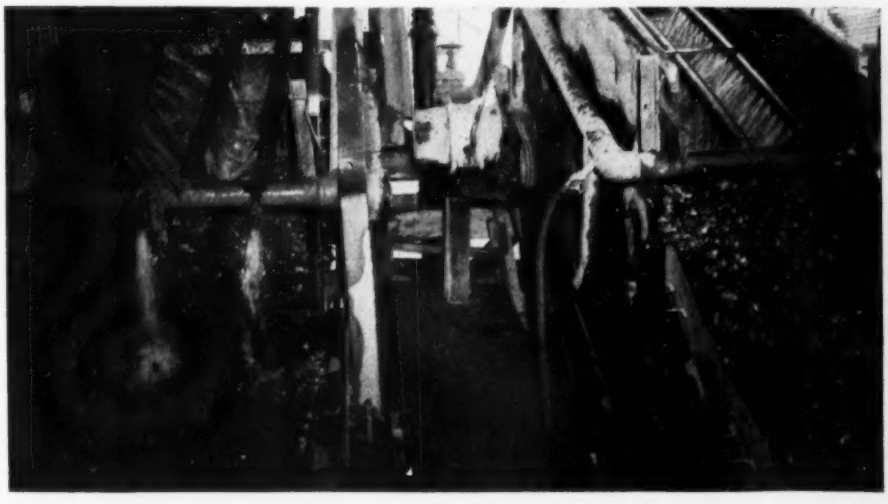
Throughs from the scalping screen plus the primary crusher product discharge to an inclined 30-in. belt conveyor, 220 ft. centers, that carries the minus 1½-in. material to the top of the plant. The conveyor is powered by a 40 hp. motor. Discharge is to a pants leg chute with a proportional flop gate that can divert all or any part of the stream to either of two 4- x 10-ft. Simplicity 4-deck vibrating screens, operating in parallel. These screens are frequently operated as three-deck



Conveyor, upper left carries primary crusher throughs to plant. Secondary crusher, lower center, discharges to conveyor inclining up to top of truck hopper, right foreground. Oversize on top deck of screen, plus ¾-in., is piped back to transfer conveyor carrying pit-and-run material to primary crusher. Abandoned pit to left, new pit to right

screens, with the top deck of 1¼-in. mesh serving as a scalping screen when special sizes of gravel are required. The second deck, which is also the top deck when the scalping screens are not in use, is ⅜-in. mesh on one screen and ¾-in. mesh on the other. Third and bottom decks on both screens carry ¼- and 3/16-in. screen cloth respectively. Throughs from the bottom decks of the two screens, minus 3/16-in., are chuted to an Eagle sand dewaterer with 20-in. diameter screws. Dewatered sand falls to a plant bin for either rail car or truck loading. When the bin is full, the sand is flumed to storage in a worked out portion of the new pit. Overflow from the sand screw is flumed to waste in the old abandoned pit on the opposite side of the plant. Fines are recovered from this overflow in a settling tank constructed by John Roskovensky, superintendent at the plant. A valve, located in the conical bottom of the tank and activated by the weight of collected sand, automatically opens to discharge the material to a stockpile under the flume.

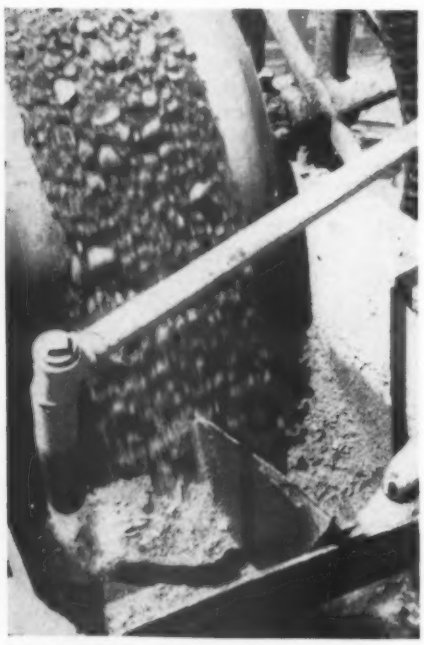
Throughs from both third decks, minus ¼-in., fall to a plant bin. The reason for the difference in mesh sizes of the second decks on the two screens as well as the proportional flop gate in the pants leg chute providing feed for the screens, is the requirement for producing widely divergent material to meet specifications of two states. The first screen, with ⅜-in. mesh on the second deck, provides for minus ⅜-in., plus ¼-in. material while from the second screen, the minus ¾-in., plus ¼-in. fraction by-passes the secondary crusher and is chuted direct to the belt carrying the secondary crusher discharge, producing gravel



Four-deck vibrating screens operating in parallel receiving feed from proportioning pants-leg chute at discharge end of 220 ft. conveyor that collects primary crusher product

John Roskovensky, general superintendent of gravel plant No. 1

New cut of bottomless bucket slackline operation, which works to a 25-ft. depth



Discharge end of 220 ft. conveyor from primary crusher. Note proportioning pants-leg chute directing any percentage of flow to either of two vibrating screens. In this position, flow to screens is evenly divided

designated as Indiana No. 9, which is used in a bituminous plant located at one end of the stockpile area. Indiana No. 9 varies in specified percentage of crushed gravel, with a range from 50 to 65 percent. Other specifications of this gravel are:

90 to 100% retained on 3/16-in. mesh
10 to 25% retained on 1/2-in. mesh
100% passing 3/4-in. mesh

Oversize from both second decks, plus ⅜-in. and plus ¾-in., is chuted to the secondary crusher, a Jeffrey-Traylor 2-ft. gyratory set at 1-in. opening, which is driven by a 75-hp. motor through a V-belt. Crusher throughs and material that by-passes the crusher are collected on a 24-in. belt conveyor, 150 ft. centers, for elevation to the top of a truck hopper, where it falls to a 3- x 6-ft. Simplicity three-deck screen. Oversize on the top deck, plus ¾-in., is chuted to the transfer belt carrying pit-run material to the primary crusher. Oversize on the next two decks, plus ¼- and 3/16-in. falls to the one-compartment truck hopper. Throughs from the bottom deck, minus 3/16-in., are flumed to waste in the worked out pit.

When plant demand is for a different specification material than the formentioned flow will yield, oversize on the top decks of the two parallel screens, plus ¾- and plus ⅜-in. material, is chuted to an auxiliary 3- x 6-ft. Deister three-deck vibrating screen. Mesh sizes on this screen are 1½-, 1¼-, and 3/16-in., with oversize on the top deck going to the secondary crusher. Oversize on the next two decks and throughs from the bottom deck each fall to individual bins in the plant. Greater variation in the final product is of course possible by changing mesh sizes on various screens.

Railroad cars or trucks may be loaded from either plant hoppers or auxiliary hopper. Overflow from all bins is trucked to the yard storage area, where it may be loaded either to railroad cars or trucks by a 1-cu. yd. Lorain gasoline powered clamshell. A rubber-tired Nelson bucket loader is much in evidence around the plant and stockpiles. This loader is occasionally used for loading fines to trucks from the deposit for the haul to the plant. Water for the plant operation is pumped from the old pit by two 6-in. Dean-Hill centrifugal pumps operating in tandem, with a 50-hp. motor driving the suction pump and a 40-hp. motor driving the pump receiving feed from the first pump.

The largest percentage of this plant's output is sold for concrete aggregate, with smaller percentages going to county road surfacing and hot mix plants. Shipments from the plant are approximately half by rail and half by truck, in a 200 mile radius.

Standard Materials Corporation maintains its main office in Indianapolis, Ind., with branch offices at its plants in Indianapolis, Lapel, and Clinton, Ind.

Fire Destroys Dolese Crushed Stone Plant

ON September 1 and 2, 1948, a fire of unknown origin completely destroyed the limestone crushing plant of the Dolese Brothers Co., at Richards Spur, near Lawton in southwestern Oklahoma. This company is the largest producer of crushed stone in Oklahoma, and the Richards Spur plant is the largest of three operated in Oklahoma by the company, which has contracts for 150 cars per day. The Richards Spur plant has been producing about 60 cars per day for state construction.

The fire was already well on its way when discovered by a workman on the night of September 1. All efforts by fire departments could not bring the fire under control and by next morning all equipment, including the primary gyratory crusher, secondary cone crushers, trommels, vibrating screens, belts, motors, and air separator in the fine-grinding room, was a total loss. No evidence could be found in the ruins that might indicate the cause of the fire.

W. S. KNOX, general production manager of the Dolese Company, estimated the loss to be about $1,500,000 and the time required to rebuild about one year. In the meantime production will be increased at the Big Canyon and Bromide plants of the Dolese Company in the Arbuckle Mountains of south-central Oklahoma.

The Richards Spur quarry has been operating since 1904. It has a face nearly 200 ft. high in the fine-grained, compact Arbuckle limestone of Lower Ordovician age, which yields excellent stone for concrete aggregate and railroad ballast. The Big Canyon plant in the Arbuckle Mountains also works the Arbuckle limestone.

Explosives Consumption

CONSUMPTION of industrial explosives in the United States reached a new high record of 651,390,937 lbs. in 1947, Bureau of Mines reports. This total was 12 percent greater than the former peak annual consumption in 1917. Of the amount, the quarrying and non-metal mining industries used 109,820,924 lbs. of high explosives last year, compared with 102,146,358 lbs. in 1946. However, use of black blasting powder in these industries decreased from 1,773,450 lbs. in 1946 to 1,553,550 lbs. in 1947.

California Gypsum

OUTPUT of gypsum in California in 1947 was the largest in quantity and value ever reported in the State, and for the fifth consecutive year an increase has been recorded, the State Division of Mines reports. Production during 1947 totaled 809,934 net tons valued at $2,062,574 as compared with 618,007 tons worth $1,431,884 in 1946.

LIGHTWEIGHT CONCRETES

Gas, foam and lime concrete developments in Germany and Sweden

By F. O. ANDEREGG*

UNDER THIS TITLE Prof. Otto Graf presented a paper before the annual convention of the German Concrete Union on June 3, 1948, in Wiesbaden. In his talk he provides answers to seven questions:

1—What are gas-, foam-, and lime-concretes?
2—What properties of these three make them important in construction?
3—How can quality gas and foam concrete be produced?
4—How is lime concrete manufactured with desirable properties?
5—What building units are being made from these?
6—What production can be obtained with present capacity?
7—Under what specifications will it be possible to make wide use of these materials in Germany?

1) Gas concrete is produced by adding gas producers to a soupy mix of fine mortar under controlled conditions. The first application was disclosed by E. Hoffmann in 1889 in D.R.P. 55,919. Foam concretes include "Cello Concrete," "Iporite," "Betocell," and so forth, and are produced with the aid of air entraining agents. Lime concrete is a modification of the sand-lime brick obtained by mixing silicious materials with lime and water and autoclaving. In Sweden "Ytong" belongs to this class. In Germany it is called "Microporite" or "Turrit," while in the U. S. A., it bears the trade name, "Kaylo."

2) In making gas or foam concrete, the exact volume produced is not always the same, while the units are always denser at the bottom than at the top. For instance, from a 42 cm. high specimen of gas concrete 7 cm. cubes were cut having densities of 50 p.c.f. at the bottom and 44 at the top and with compressive strengths 530 p.s.i. at the bottom, as compared with 340 at the top.

3) The shrinkage of gas or foam concretes may reach as high as 0.4 per cent, but may be brought under control by curing the units under high steam pressure. In considering the question of what densities will provide the strengths to withstand handling and also the building loads, the conclusion is reached that for fill-in or partition units, 300 to 400 p.s.i. should be adequate, while for units reaching the height of one story, a minimum of 570 p.s.i. should be reached. For the former, when hardened in the autoclave, unit weights of 35 to 40 p.c.f. are adequate and for the load carrying large slabs, about 45 p.c.f. The "K" factors for these concretes will vary from as low as 0.8 to about 2.0 To produce the insulating value equivalent to the German 38 cm. wall will require only 6 to 8 cm. with lime concrete and 15 cm. with gas concrete.

When using the autoclave, the greatest strength is obtained with steam pressure at 120 to 135 p.s.i. for 16 to 24 hours, but the minimum shrinkage in the processed units seems to be reached after about eight hours. If portland cement is used, attention should be given to its free lime and magnesia contents, while high iron cements seem to give very fine results. Careful choice should be made among quartz sands as to source and fineness.

Among air hardened units, to secure 300 p.s.i. at 28 days, it will require something like 6.3 bags of cement per cu. yd. with a density of 37 p.c.f., while with only 4.5 bags the unit weight must run about 50 p.c.f. When such air cured units are used the problem of controlling the development of shrinkage cracks can be helped by using leaner mortars and reinforcing around window and door openings.

4) With the lime concretes, which have to be cured under high steam pressure, volume changes are quite small. When the lime content is low, there may arise a slight expansion, while a higher lime may induce a trace of shrinkage. Strength-weight ratios are apt to be quite high with quartz-sand-lime mixes, as reported from USA. (ROCK PRODUCTS, May, 1936). Results with the Swedish Ytong ran for 5 lb. lime per cu. ft., 270 and 750 flexural and compressive strengths, respectively, while when 9 lb. lime was used in this volume, these values rose to 430 and 1080 p.s.i.

5) Light weight concrete units are suitable as regular blocks, as larger slabs for partitions, and when reinforced, they may serve as lintels and other light beams as roof slabs and for floors of light capacity.

6) In Germany present production capacity is more than 100,000 cu.m. (equivalent to 45 million board feet or 7 million blocks) of air dried gas and foam concrete and about one third as much steam hardened. Both Ytong and Siporex will produce about 300,000 cu.m. in Sweden this year.

7) Before Prof. Graf would be willing to recommend expansion of present facilities, he would want to be sure of the qualities of the product such as:

a. Size tolerances should be within 2 mm. (0.04 in.).
b. Strength may be as low as 300 p.s.i. for partition units, but should approach double this with slabs reaching one story high. The units must be strong enough to handle without much breakage.
c. Unit weight and thermal conductivity. The lower the better, but practically about 30 p.c.f. for filler units and 44 for load carrying seem to be about the lower present feasible limits.
d. Grip for stucco should be adequate and here the mechanical bond of the gas and foam concretes is of advantage. Hebei has worked out a spray application of thin stucco which works very well.

Weather resistance may not be so important when protected by suitable stucco. However, such materials as Ytong and some of the gas concretes have stood up very well to European weather. The units should not be in capillary contact with the ground.

With a construction 6 in. thick and 8 ft. high, the load carrying capacity of the wall may be assumed as 0.7 of the cube strengths. *Neue Bauwelt*, 1948, No. 23, pp 356.

*Director, Building Materials Research, John B. Pierce Foundation

Antiseptic Cement

A NEW antiseptic cement has been patented by C. R. Amberg and W. J. Knapp, Alfred, N. Y., which, when used in concrete, is said to make the latter virtually germ-free.

Concrete floors and walls are recognized as possible lurking-places of many types of germs, such as athlete's foot in gymnasiums, various diseases in hospitals, and souring and spoilage in dairies and other food-handling places.

Under actual working conditions, sections of floors in which untreated cement was used, were swarming with germs, while those sections made with the antiseptic cement remained germ-free.

Long Conveyor Bridges River

Open new quarry across Shenandoah River from Riverton plant of Riverton Lime and Stone Co., Riverton, Va.

By W. R. CLIFFE*

NOT many lime concerns have had the colorful historical background which the Riverton Lime and Stone Co., Riverton, Va., has experienced. This company, which recently completed a big quarry relocation program, grew out of an idea of Samuel Carson, a commission merchant of Enis-killen, Ireland, who purchased approximately 1000 acres of land in the Riverton section of Virginia in 1865 for the express purpose of raising Caracul sheep. In spite of the assurances of his agent that conditions were ideal, the 100 sheep sent out in the following year failed to thrive and the investment proved to be a complete loss.

Nevertheless, Mr. Carson left Ireland and, with his family, settled in Riverton. Upon learning that his property contained valuable limestone deposits, he erected a kiln for the burning of lime. The first kiln was started in 1868.

Business was carried on under the firm name of Carson and Sons until 1904 when a corporation was formed under the name of the Riverton Lime Company. In 1908, William E. Carson (the beloved "Bill" of the lime industry), became general manager and continued in active and progressive leadership of the company through its period of greatest expansion.

In the twenties the discovery of rock suitable for the production of hydraulic lime led to experimentation and ultimately to production of "Flamingo" hydraulic lime in 1929. This product has grown in importance, and for years has been the standard against which all hydraulic limes are measured.

This same period witnessed a marked decrease in the demand for railroad ballast which resulted in a revision of plant facilities in order to produce smaller sizes which were in increasing demand for other purposes. The plant is now equipped to produce ballast, road stone, concrete aggregate, and agricultural limestone.

In 1935 facilities were added for the manufacture of rock wool. This plant produces rock wool in loose, granular, and batt form, all three products being manufactured under the trade name "Perfection." During this same year the company was reorganized under the name of the Riverton Lime and Stone Company, Inc.

In spite of the demands of private enterprise, Mr. Carson was also a public spirited citizen. He was instrumental in establishing President Hoover's camp on the Rapidan and, as first chairman of the Virginia Conservation Commission, in the building of the Skyline Drive and the development of the Shenandoah National Park. At Front Royal, Va., not far from Riverton, Mr. Carson's part in the development of this great project is honored by an historical marker which reads:

> William E. Carson, of Riverton was the first chairman of the Virginia Conservation Commission, 1926-1934. As such he was a pioneer and leading spirit in the establishment of the Shenandoah National Park and Skyline Drive; The Colonial National Historical Park; the State Parks, and the State System of Historical Markers.

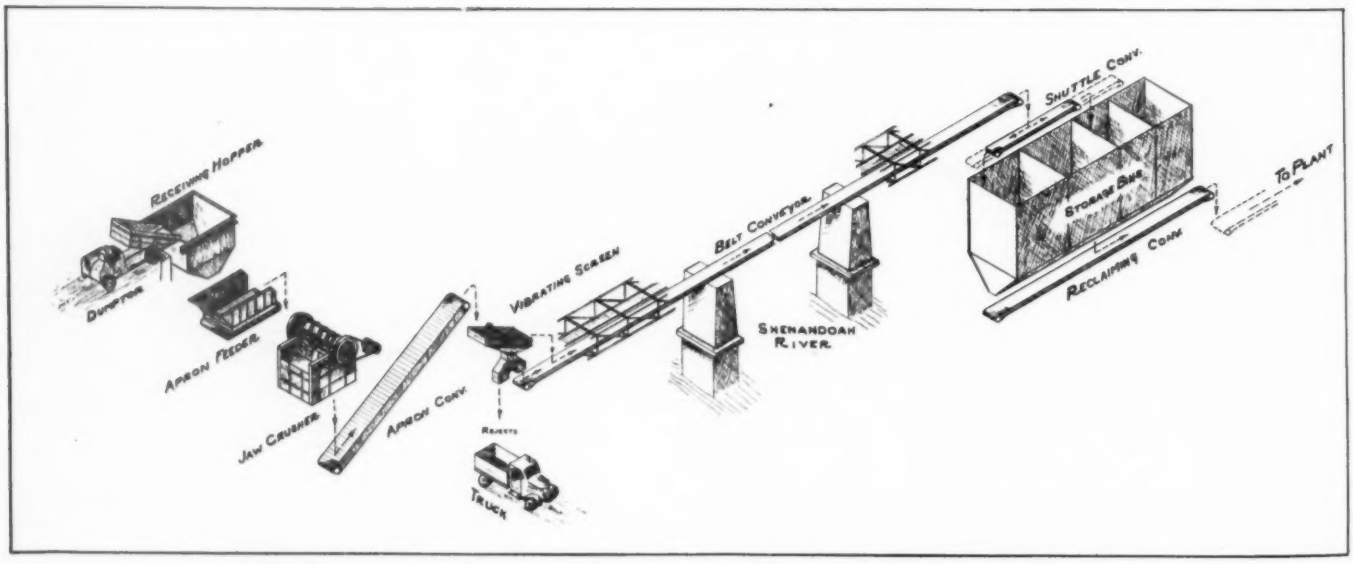
William "Bill" E. Carson died in the spring of 1942. Edward I. Williams became president of the company, Harold W. Smith vice-president in charge of operations, and John S. Hedrick, secretary and vice-president in charge of sales.

Quarry Relocation Problem

During the war years it became apparent that the principal quarry was approaching ultimate depletion and that another source of stone would have to be developed for the manufacture of crushed stone and agstone.

Stone of suitable quality and sufficient quantity lay only a few hundred feet away but the Shenandoah River flowed between the plant and the

*Consulting Engineer, L.I.M.E., Hershey, Penn.



Schematic sketch of plant flow from primary crushers and belt conveyor over river to plant bins

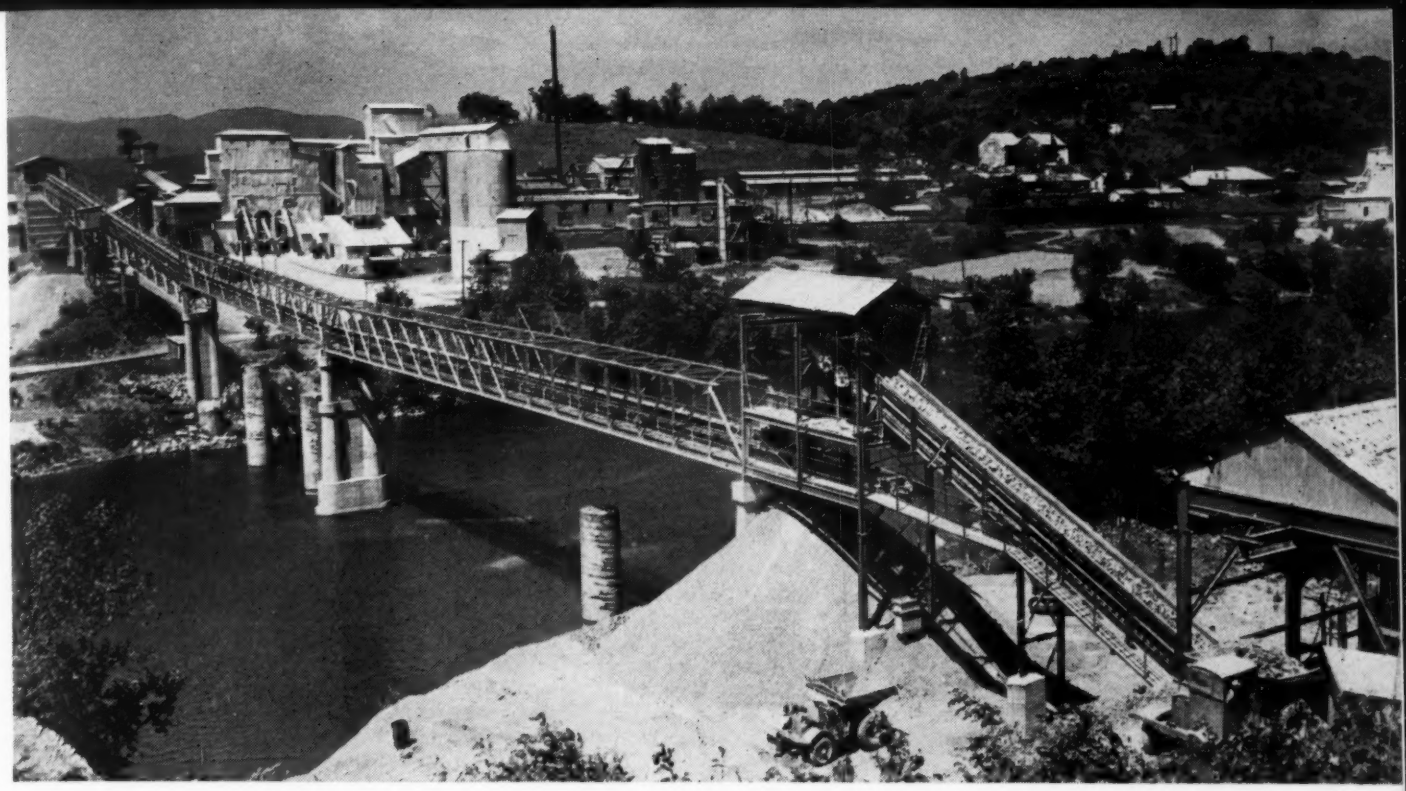


Fig. 2: Interesting truss bridge construction supporting conveyor moving product from primary crusher serving quarry across the river from plant

stone deposit. Existing highway bridges were so located that the cost of hauling over established routes would be prohibitive.

The cross river workings had been exploited up until 1936 when the bridge carrying the narrow gauge track was carried away by a flood which reached a peak of 42 ft. above normal. The flood of 1942 had crested at 50 ft. above normal and surpassed all previous records for destructiveness. Construction materials and equipment of all kinds were extremely difficult to obtain.

With automotive transportation out of the question because of cost, with the stone supply lying on the same side of the river as the plant almost exhausted, with the memory of the 1942 flood and possible future floods of even greater magnitude to consider, it was decided to take the steps necessary to move the operation across the river and to install a belt conveyor system to the plant.

With the shortage of steel, the provision of a bridge some 675 ft. long presented a major problem. It was decided that design and fabrication of the necessary trusses would require a prohibitive length of time. Exploration of the market revealed that used truses could be acquired from the T.V.A. and it was decided that, although these trusses were not all the same, they could be used satisfactorily.

Piers were designed to carry the available trusses well above the record high water of 1942 and construction was begun by Blackwell Engineering Co., Warrenton, Va. Only one of the five piers erected required coffer dam work, the others all being constructed above normal water level.

At this point in the development, the consulting services of L.I.M.E. of Hershey, Penn., were engaged for the design of the operating facilities. The major responsibilities continued to fall upon Mr. Smith who was not only required to maintain operation during the transition period, but also to supervise the dismantling and transportation of equipment to be relocated on the far bank of the river. The new facilities were placed in operation in the early months of this year.

The Operation

At the site of the new quarry, the overburden will be removed by hydraulic stripping. The terrain is rugged and early development of the quarry is being accomplished by jack hammer and wagon drilling. After a suitable period of preparation, well drill operation will be inaugurated. Compressed air for the drilling operations is supplied from a compressor house located near the crusher building. All of this equipment is Gardner Denver.

The comparatively narrow stratification of the steeply pitched deposit plus a careful study of primary explosives results in fine fragmentation and minimizes secondary blasting requirements. Quarry run rock is loaded to Koehring Dumptors by means of a

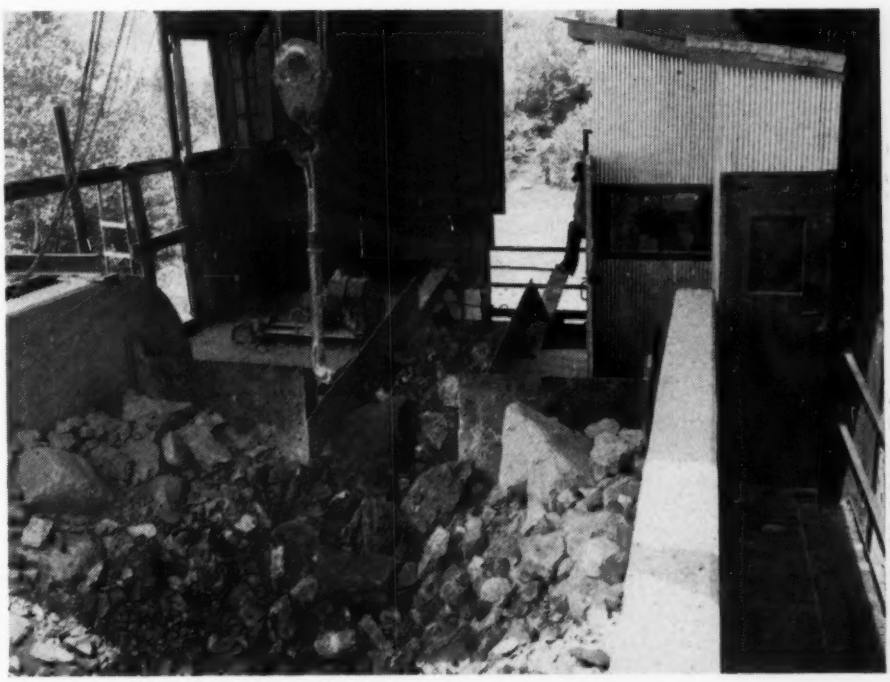


Fig. 1: Interior of primary crusher building

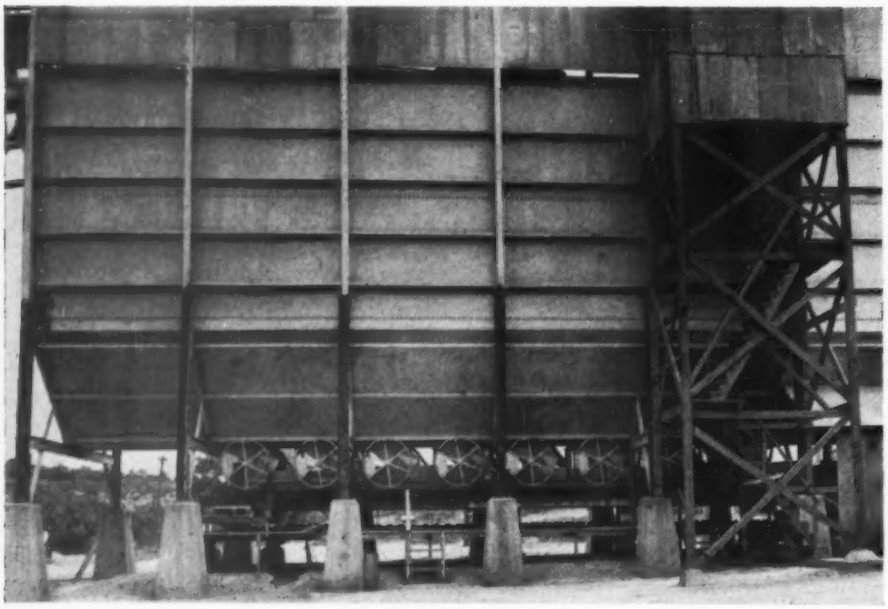


Fig. 4: Stone storage bin and reclaiming conveyor below

Bucyrus-Erie Model 37B shovel with 1½-cu. yd. dipper.

The accompanying schematic diagram shows the flow of material from the dumping point to the point at which it is delivered to the facilities of the original installation. The Dumptors discharge their load into an ample receiving hopper from which it is fed to the crusher by a 48-in. x 18-ft. heavy duty Telsmith feeder.

An Allis-Chalmers 40- x 42-in. jaw crusher reduces quarry rock to minus 8-in. The crusher house is equipped with excellent operating facilities. The operator's booth provides a clear view of both feeder and crusher as well as of the apron and belt conveyors which carry the crushed stone over the river. An electric overhead hoist on monorail is capable of moving the largest crusher parts to trucks on the outside of the building. Fig. 1 shows an interior view of the crusher building.

From the crusher the stone is carried on a 42-in. x 98-ft. 10-in pan conveyor to a two-deck vibrating screen. This screen is equipped with a top deck having 2- x 3-in. clear openings and a bottom deck with 1-in. clear openings, and is so arranged that the fines may either pass to the belt conveyor or be discharged to the ground beneath the screen house. This provides an opportunity to bleed off mud and quarry refuse when such a step is deemed desirable. Material from the screen is discharged to the 30-in. belt conveyor, 674-ft. centers, mounted in trusses across the river. Fig. 2 shows a general view of the new installation and the plant as seen from the top of the deposit. Some of the piers of the bridge over which the narrow gauge railroad ran from the quarry prior to 1936 are still standing. The site of the abandoned quarry is off the picture at the right.

On the plant side of the river the belt conveyor discharges to a 30-in. reversing shuttle belt conveyor, 25-ft. centers, and is distributed to a 1400-ton steel storage bin for stone. Details of the facilities on top of the storage bin are shown in Fig. 3.

Stone is withdrawn through eight hand-wheel-operated, angle-of-repose bin gates by a 42-in. apron conveyor, 60-ft. centers. This reclaiming conveyor discharges the stone to conveying facilities comprising a part of the original plant equipment. Fig. 4 shows the stone storage bin and recovery facilities.

The Link-Belt Co. furnished the vibrating screen, all belt conveying equipment, the bin gates beneath the rock storage bin, and the reclaiming apron conveyor.

Electrical controls throughout the new installation have received the personal attention of Mr. Smith, who, being an electrical engineer, has spared no effort in the provision of a modern and efficient control system.

The management of the Riverton Lime and Stone Company is to be congratulated upon the successful completion of a comprehensive program which should assure a continuous supply of stone for a period of many years.

Fig. 3: Distributing conveyor above storage bins

Quarries Win Safety Honors

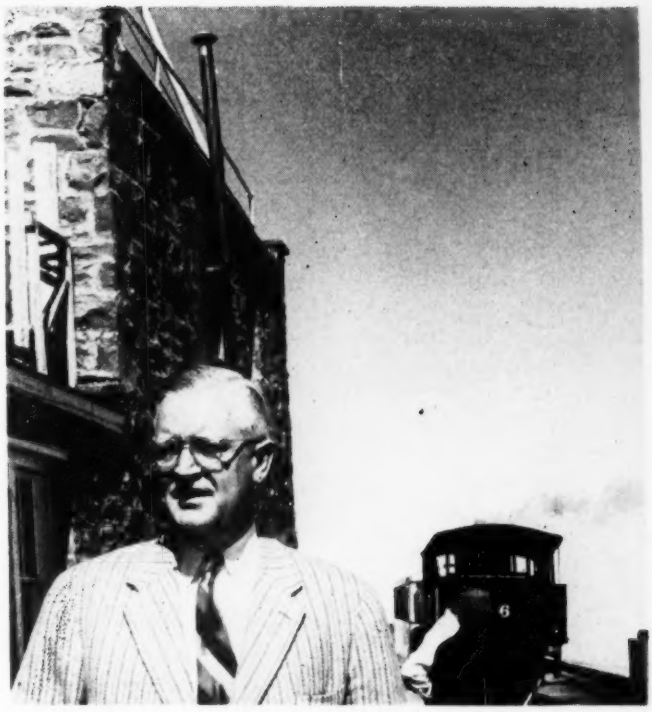
MARQUETTE CEMENT MANUFACTURING COMPANY, Chicago, Ill., has received three Certificates of Achievement in Safety from the U. S. Department of the Interior, Bureau of Mines, in recognition of the outstanding record of safety in operations at Marquette quarries in Oglesby, Ill., Cape Girardeau, Mo., and Earlham, Iowa. Workers at the Oglesby quarry performed 126,157 man-hours of work without a lost-time accident in 1947, while the records of Cape Girardeau and Earlham were 63,622 injury-free man-hours and 44,960 consecutive man-hours of safe work, respectively.

Ceylon Cement Imports

CEMENT IMPORTS into Ceylon soared in the third quarter of 1947, according to a report in *Mineral Trade Notes*. Large increases came from the United Kingdom, United States and Belgium. Previously Belgium had not participated in the postwar cement market in Ceylon.

Directors Meetings In Colorado Springs Discuss Convention Plans

Shortages in cars and cement; changes in aggregate specifications discussed at joint meetings of directors of National Sand and Gravel and National Ready Mixed Concrete Associations in two-day session



F. P. Spratlen host to joint directors meetings, on arrival at top of Pikes Peak

WITH DEMAND for products of the sand, gravel and ready-mixed concrete industries at an all-time high, producers still have many problems to solve, and these were discussed at length by the Boards of Directors of the National Sand and Gravel and the National Ready Mixed Concrete Associations at the Broadmoor Hotel, Colorado Springs, Colo., Sept. 20 and 22. The intervening day was given over to sightseeing and getting better acquainted, under the able supervision of F. P. SPRATLEN, JR., Denver, Colo., who has urged a Colorado Board meeting for the past ten years. The general concensus at the close of meeting was that this had been the most enjoyable mid-season directors' meeting ever held. More of the wives of members attended than ever before, and a special program was arranged for their enjoyment.

The meeting arrangement was somewhat different from those at previous meetings of the Boards. One-half day was devoted to the Board meeting on the sand and gravel industry and one-half day to the Board meeting on the mixed-concrete industry, with a half day in which the two Boards met jointly and discussed problems common to both industries, thus conserving a good deal of time required for repetition. As a matter of fact all the meetings were open to members of both Boards and their guests, with the result that the discussions covered a broad ground of general interest to every one.

N.S.G.A. Association Program

T. E. POPPLEWELL, Fort Worth, Tex., president of the National Sand and Gravel Association, presided at the meeting of his Board. He introduced the subject of a program for the enlargement of association membership. It was unanimously agreed that the regional meetings conducted under the auspices of a committee of local members to which all other local producers are invited, and addresses made by the Washington members of the staff, were proving to be an excellent way of bringing the Association and its work to the attention of producers who for one reason or another have never had direct contact with it. Most of the discussion had to do with details as to the best methods of following up these new contacts. The Associatioin is in excellent financial condition, but all members believe that the work done by the Washington office staff is of such outstanding value to the entire industry that many more, especially the relatively small producers, could well afford to become active, dues-paying members.

There was quite a lengthy discussion of the types and details of programs for both the future Board meetings and the future conventions. V. P. Ahearn, executive secretary,

Combined meeting of the boards of directors of the National Sand and Gravel Association and the National Ready Mixed Concrete Association

Car on cog-wheel railroad which was chartered to take the Denver meeting directors and their families up to the top of Pikes Peak

through correspondence with the members of both associations, had already collected a number of constructive suggestions for improving convention arrangements. The chief suggestion, which was immediately acted upon, was to combine the general reports of the Washington staff and have them delivered to a joint session of the two Associations, which will conserve considerable time and expenditure of energy on the part of the staff. More participation on the part of the membership in various features on the program was also recommended.

STANTON WALKER, director of engineering, described in some detail the direction that the newest specifications for aggregates are taking, with particular emphasis on those of the civil works section of the Corps of Engineers, U. S. A. Hitherto, most of the public works of the Corps of Engineers have been largely in localities where aggregates were produced especially for the particular job. There has not been a great deal of experience with commercial aggregates. Now, however, much of the flood prevention and work in connection with improvement of navigation of inland rivers comes within range of commercial producers' established plants. Some producers are finding that materials they have supplied locally for many years will not meet the severe specifications the Army engineers are now using.

The latest wrinkles to be introduced are the theory of incompatibility of aggregates of different mineral compositions, and the theory that a small percentage of silica in the form of opal or chalcedony will cause destructive expansion when used with high alkali cements, because of a chemical reaction. The method of determining whether a sand particle is chalcedony or quartz is a rather delicate problem for an expert with a petrological microscope. However, on the basis of such examinations of a relatively few grains of sand, the Army engineers have rejected some Mississippi and Missouri River sands that have been successfully used in concrete construction for many years.

The Army engineers are setting up area laboratories, so that producers should be able to determine well in advance of construction whether or not their sources of material will be approved. If the source of the material is accepted as suitable for the particular job, the producers' problem will then be confined to meeting size and grading specifications which are by no means the least difficulties. The discussion brought out some of the peculiarities of the specifications. For example, on one Middle West job, a siliceous fine aggregate is permitted in combination with a dolomitic coarse aggregate, but not with a high calcium limestone aggregate. The theory is that an aggregate like limestone with a low coefficient of thermal expansion is not to be used with a siliceous aggregate with a relatively high rate of thermal expansion; but granite, or trap rock coarse aggregate may be used with siliceous fine aggregate or natural sand. These theories seriously limit the use of natural sand in the Middle West where crushed stone aggregates other than gravel are generally limestone.

The problems presented the industry by such developments call for more extensive research by the Association, Mr. Walker said, and the kind of research that will withstand the most hard-boiled analysis. He said research is also needed to continue to expand the markets for gravel, such as for bituminous pavement construction.

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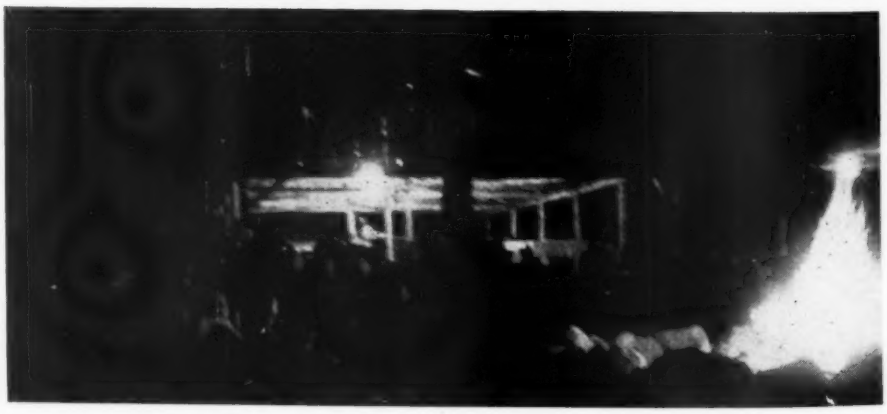

Above: Steak dinner served at Rotten Log Hollow. Below: Camp fire gathering at night

...of Problems In

MANUFACTURING ROCK WOOL

Part 1. First of a series of articles on processing problems encountered in the manufacture of rock wool and methods of achieving more efficient operation

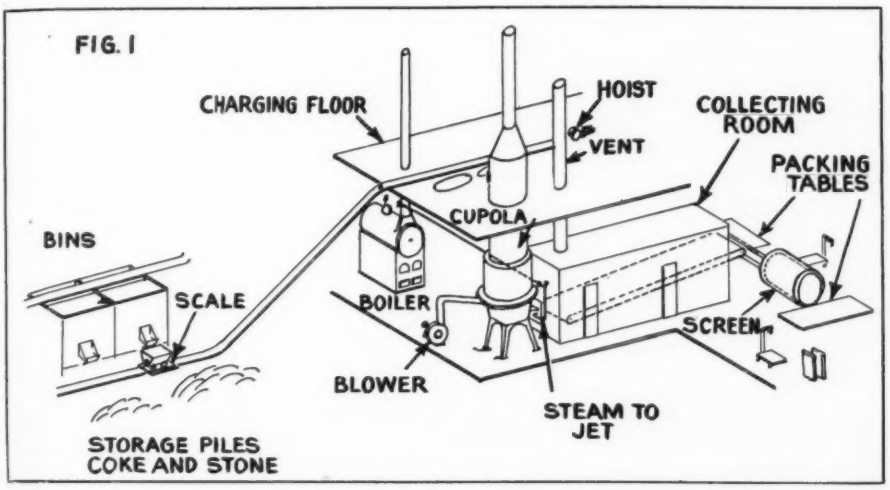

Fig. 1: Plan showing bare essentials of rock wool plant using readily fusing rock or slag

By VICTOR J. AZBE*

IN its more elementary principles, the subject of rock wool cupola design and operation is quite simple; all one needs is a plant such as in Fig. 1, and a fairly readily fusing rock or slag, melt it, then blow it to wool with a blast of steam.

In the scale of modern manufacture, however, this simplicity disappears and the technical problem becomes intricate.

The reasons for this are that although two rocks may analyze the same, the minerals may be differently combined and consequently act entirely differently. Then the process of heating and melting is one that should puzzle even the most advanced combustion engineer.

As there is a desire for an ultimate product of definite fineness and color, it seems that there must be, all the way back through the entire range of operations, some standard that should not deviate far from the ideal. This starts with the selection of rock in the quarry, the sizing of such rock, the proportioning of coke, the mode of charging, and uniformity of distribution of the charge. There is the matter of uniformity of coke size and coke quality. Various kinds of rock will require different amounts of heat or different degrees of temperature. Some will fuse readily and directly without a chemical change, while others, before fusing, may have to pass through several transformations, some of which may require a great deal of heat.

There is the matter of air blast, of temperature of this blast, mode of preheating of air, value of preheating air, combustion of coke, nature and temperature of gases leaving the cupola, and disposition and possible utilization of sensible and potential heat in these gases.

There are problems of steam for blowing, proper amount, proper pressure, degree of dryness, addition of oils, correct method of application. There are also incidental problems connected with the boiler; its proper size, availability of water, purity of such water, feed pumps or injectors; hand firing or stokers, kind of coal, cost of coal, value of possible savings contrasted with possible investment.

Then the problems incidental to cooling the cupola into which again the problem of purity of the water enters, of pumping and cooling of water, of possible connection to and circulation through the boiler to conserve the heat.

Problems also are involved in arrangement of blowing room, the gathering of the product, the forming, the storing and loading, and the protection of the men.

To thoroughly master the subject and correlate all of the incidental information would need advice from people versed in geology, in chemistry, and those having specialized in combustion problems of cupolas and boilers. Material handling and other phases of mechanical engineering are other phases of the problem requiring special knowledge. It is possible that one person may be able to do it all, but this person certainly should appreciate the fact that he cannot possibly know it nearly all and should be able to call in information from many other sources.

Rock Wool Cupola Action

Any cupola, and rock wool cupola particularly, is not such an insignificant apparatus as it at first may appear; the problems centered within it are almost as many as in the blast furnace. Then in addition it is surrounded with other external factors such as raw material selection and handling. While millions have been spent in the study of the blast furnace, very little worth while information has appeared on rock wool cupolas. It is doubtful whether there is much unreleased material of special interest or value; there is, of course, considerable empirical data which has almost entirely regulated the development of the industry thus far.

In the cupola, for example, there are chemical reactions of materials numbering up to a hundred; there are many gas reactions, some very complex, and then there are the many problems connected with the flow of materials, the flow of gases and flow of heat. In this short study we can only hope to scratch the surface.

It is difficult to operate a cupola efficiently but it is impossible to operate it right without a reasonably accurate idea of what goes on within. Even if results are good, they may only seem so, while actually they still may be poor when gauged by a scientific scale, if such a scale existed.

The cupola ranks with the most

*Consulting Engineer, Azbe Corporation, St. Louis, Mo.

inefficient units extant. What saves it is that sensible and latent heat of the slag must be considered as useful heat. In its comparable units—lime or cement kilns this heat is recoverable, but is not considered useful, except for preheating the combustion air, for only the heat required for conversion of carbonates to oxides is considered "useful heat," and this determines their efficiency. If cupola performance were to be estimated in the same manner its efficiency would be quite close to the vanishing point.

A cupola has many zones within which many reactions take place; coke in its oxidization by oxygen and CO_2 on one hand, and rock its preheating dissociation, combination, melting and fluxing on the other. Fig. 2 illustrates the location of the main zones and of the main reactions taking place therein. The curve shows the temperature rise of material in its downward travel. The gas temperature itself is higher than this by several hundred degrees.

Referring particularly to coke, the lowest portion of the cupola above the solidified iron and its entrapped dolomite, is the liquid iron, and above this the lower specific gravity molten mixture of calcium, magnesium silicates and aluminates. Within this liquid mass, and a space above it is the coke, which carries all of such weight burden of the charge above as may not be transferred by the lateral thrust of the walls of the cupola.

This lowest coke occupied space above the liquid slag is quite open and the air introduced here through the tuyeres can circulate fairly freely. Very often as the coke arches or where air streams concentrate, open cavities of considerable size occur.

Within this zone a strongly oxidizing action occurs; the coke burns mostly to CO_2 and high temperatures therefore prevail. Within this space there is little to melt, except for occasional odd pieces which fall off from the mineral charge above, but there is constant dripping of melted components from above, which being of a temperature lower than that of the zone tend to cool it. Other cooling occurs through the bottom by conduction and to the water-jacket, this latter being the greatest loss although minimized somewhat by the fact that the water-cooled walls chill the adjacent melt and form an insulating crust over themselves.

This zone could be called the "Combustion Zone," or also the "Oxidizing Zone" wherein oxygen of the air is usefully used up. Combustion conditions in this zone are about perfect, temperature is very high, turbulency is very great, spaces are open for free distribution of air and solid surfaces are virtually all coke at a surface temperature of around 3100-deg. F., and

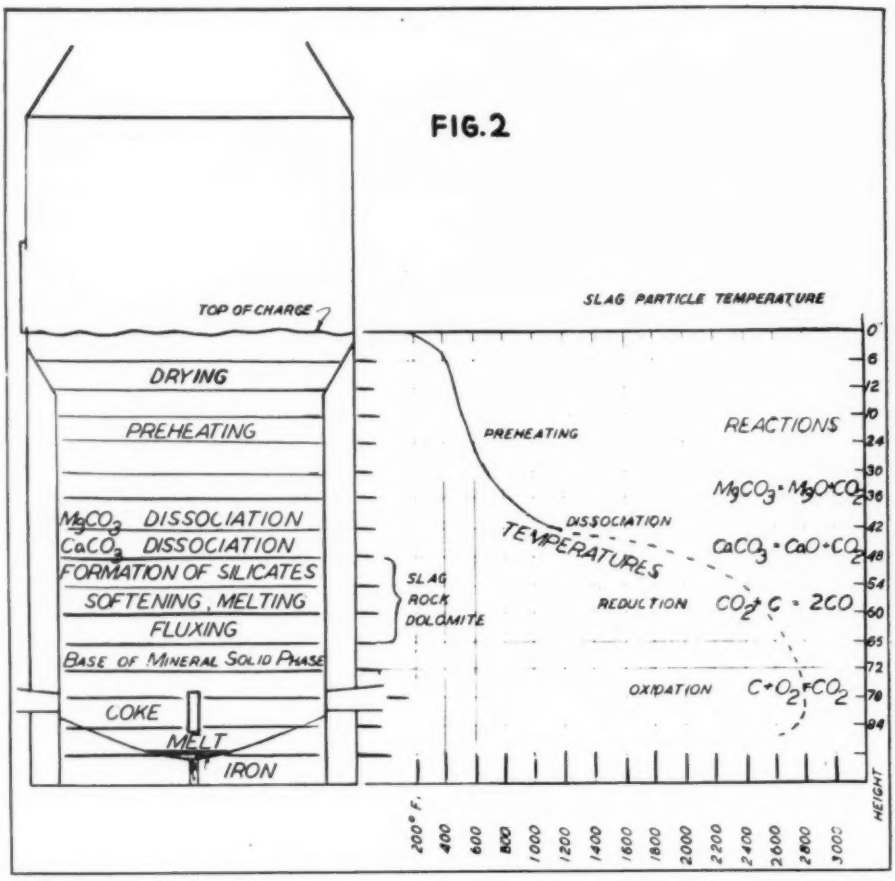

Fig. 2: Location of main zones, indicating temperatures and principal reactions taking place in rock wool cupola

in their highest state of receptivity. The greater portion of the mass is shielded to radiant cooling and probably the only retarding influence are the slight scales of coke ash which form and stay for but few moments at a time.

This oxidizing zone extends only a short distance; it is doubtful whether it penetrates further than a foot or so above the region occupied solely by coke. If it did the coke would all be burned up prematurely, the melting zone would be transferred higher up and the lower portion of the cupola would cool off.

The oxidizing zone, however, does extend a distance within the melting mineral mass, although by then the oxygen is mostly all used up and very soon thereafter reduction of CO_2 by the coke begins and formation of CO.

Figs. 3 and 4 are results of an effort to illustrate what occurs in the cupola, how coke reacts with the gases and shrinks away and in what order and where the rock and slag melt.

Physical Behavior of the Cupola Charge

Coke in its travel downward (see Fig. 3) is dried in zone "A," while in zone "B" as also in zone "C" the residual volatile matter is expelled which may in the main be hydrogen.

In zone "B" coke begins to slowly reduce CO_2 to CO and in turn dissipating itself by this reaction which gets to be more energetic when temperatures rise through zones "D" and "C."

COKE:—As air becomes available, more of the coke is consumed as it reaches "D" and "E." Highest temperature is reached at "F" where coke and air are in most intimate contact. As coke shrinks and settles to the slag puddle, it is less than half of original size. As the slag moves toward the opening, it floats the smaller pieces of coke. Whatever coke is pressed under the slag level will bob up to the surface whenever the coke above it (which is holding it down) is shifted or consumed, leaving a space for the coke to press up into. Since the molten slag will not wet or cover the coke surface, there is no interference with combustion. The melted ash of the coke forms small beads of slag which run to the surface and are removed by either blast or dripping slag from above.

ROCK:—When rock reaches zone "C," (Fig. 4) it begins to give up CO_2, and depending on its size, it soon is calcined to an oxide of calcium and silicon, or it may still have some carbonate in its center. As it reaches level "D" softening and fusion occurs and low eutectic liquids dissolve the

(Continued on page 100)

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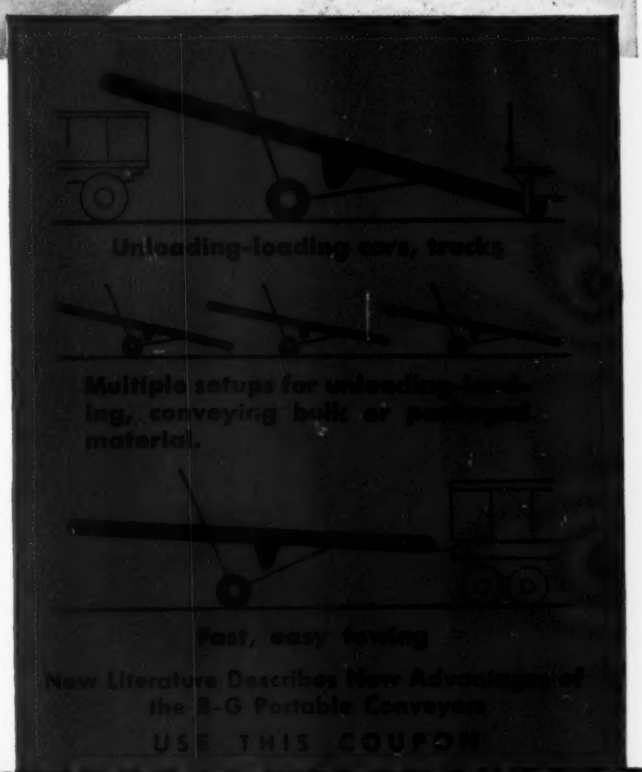
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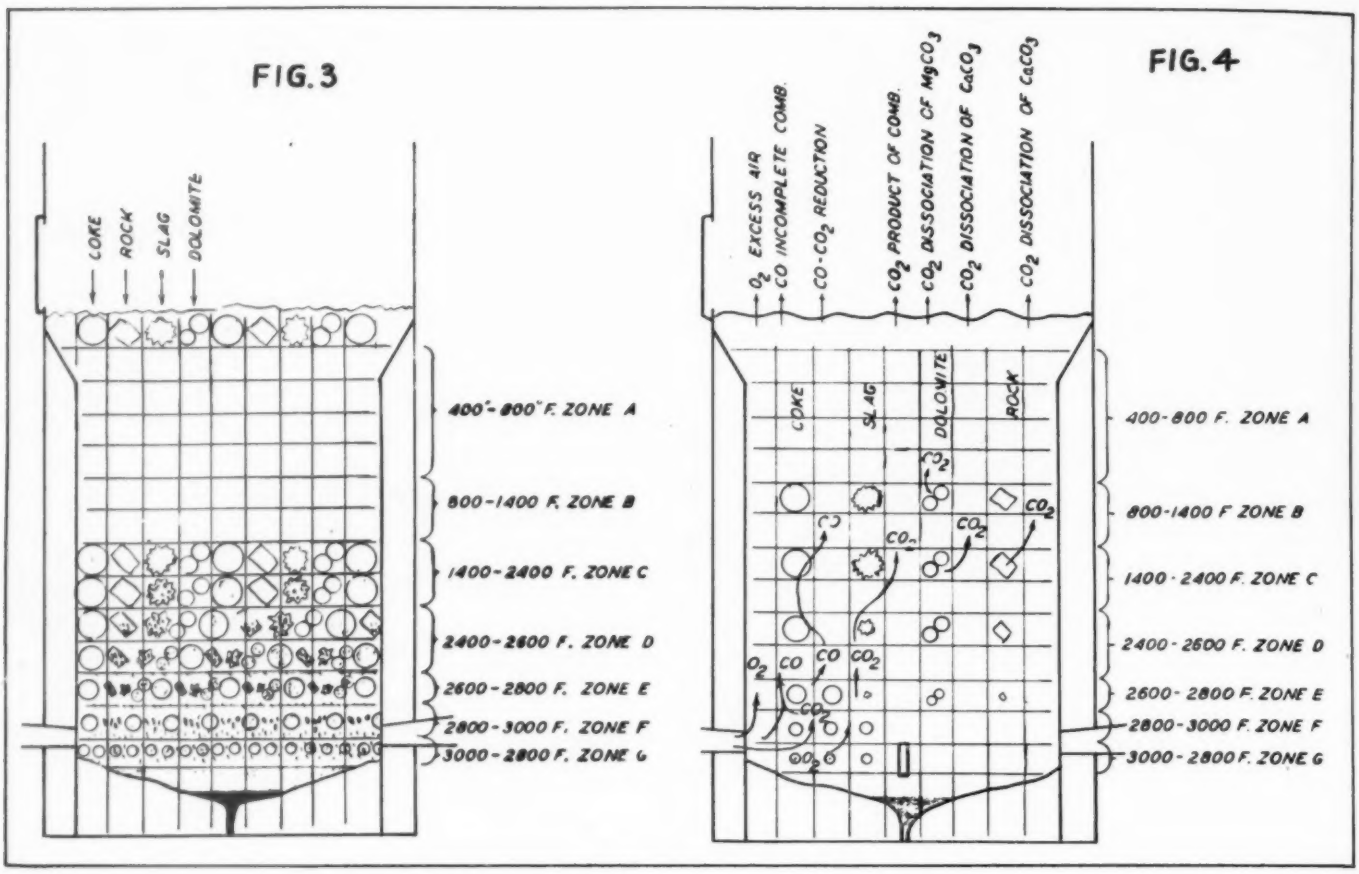

Fig. 3: Reaction zones: Coke, in its travel downward, is dried in zone A; in zone B and C, residual volatile matter is expelled. Highest temperature is reached at zone F, where coke and air are in most intimate contact. Fig. 4: Schematic origin sketch. When rock reaches zone C it begins to give up CO_2. In zone D, softening and fusion occurs

remaining solid phase that may be present, the liquid dripping slowly over the coke, other rock, slag which may be left. This liquid phase of the rock serves also to dissolve the dolomite which otherwise would not dissolve due to its high melting point. Probably only the very largest original pieces of rock are left as small nuggets when zone "F" is reached.

SLAG:—The slag pieces are generally smaller in size and no doubt have a lower fusion and melting point than the rock. Since no heat is expended in driving off CO_2, these pieces will come up to melting temperature just ahead of the rock and so by their dripping help to dissolve both rock and dolomite immediately below. Only relatively few pieces of slag are likely to reach zone "F."

DOLOMITE:—This material no doubt melts last and therefore should be considered as the least effective flux; it melts only because the rock and slag act as fluxes upon it. It is needed because of its effect on the final melt.

As it reaches zone "B" the CO_2 from the magnesium portion comes off, however, as the temperature here is low very little if any of this gas is reduced to CO by the coke. In zone "C" the CO_2 from the calcium carbonate is expelled, and through level "D" it heats up rapidly. As it sinks toward level "E" it is being slowly dissolved by the slags dripping over it and, due to its high fusing point, may quite frequently reach the liquid below "G" before becoming completely dissolved.

Observations and Conclusions

It may be observed that relatively loose conditions of packing prevail in the zone of tuyere level and just over the liquid slag surface. A slow steady dripping of liquid slag of varying viscosities can be observed. Since some gas escapes immediately above the stream of melt as it emerges from the cupola, the liquid level in the cupola is practically at the height of the emerging stream, and so quite shallow. The maximum depth of the bottom depression acting as a molten iron collector may be only approximately 7-in. The surface of the liquid slag is not more than 5 in. below the bottom of tuyeres. Much of the coke rests evidently on the *rim* of the solid refractory bottom of the cupola, while it apparently arches at short intervals, with continuous shifting over the center of the slag puddle.

Oxidation and Reduction Reactions

There are two predominating gas-carbon reactions in the cupola both of which consume carbon, the oxidizing, heat generating reaction

$$C + O = CO_2 — 14544 \text{ B.t.u.}$$

and the reducing heat absorbing reaction

$$C + CO_2 = 2CO — 5850 \text{ B.t.u.}$$

While at low temperatures oxygen may combine with carbon to form carbon monoxide, at high temperature CO_2 is formed and the complex $C_x O_y$. This last compound in turn breaks down to form CO_2 and some CO. The CO_2 will be reduced, or the CO burned to CO_2 as a secondary reaction, depending on the time of contact, the temperature, and whether there is an excess of carbon or an excess of oxygen.

Analysis of gases from the oxidizing zone was obtained by shutting air off to the tuyeres and allowing the gas to back out. This had a content of 6.5% CO_2—12.5% 0—2.5% CO, which is definitely a low temperature creating mixture, so some air must have short circuited from the adjacent tuyeres. What is important about this is, that in spite of the high oxygen content, CO is also present and so we may not rely on complete combustion of carbon within the hot zone, and the loss due to CO begins at the most critical point of the cupola—the melting zone.

It would be very valuable to know

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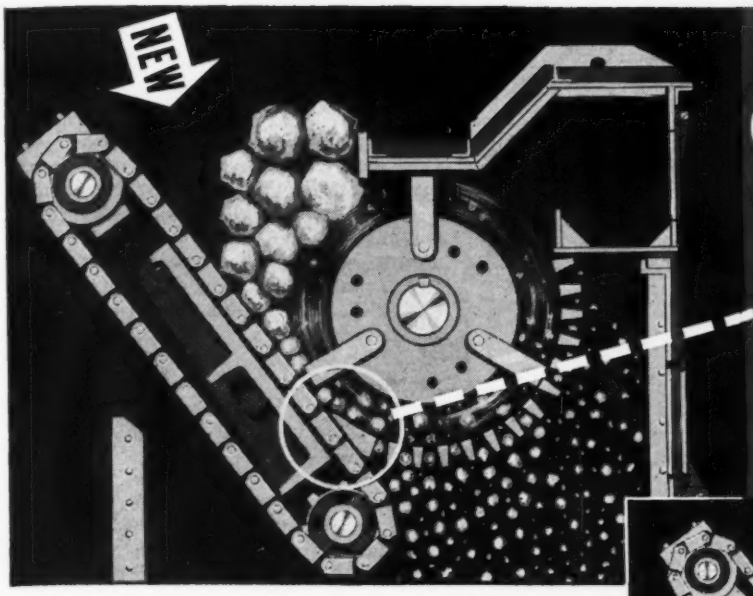

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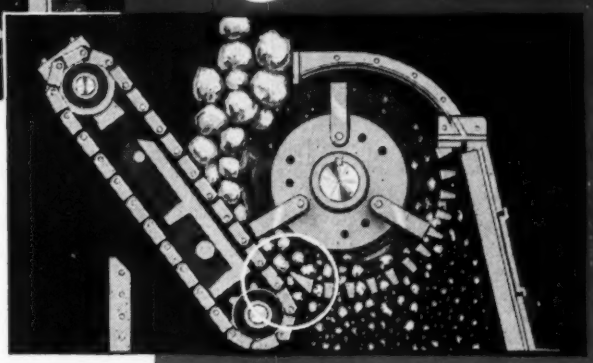

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*U.S. Patents Granted and Pending.

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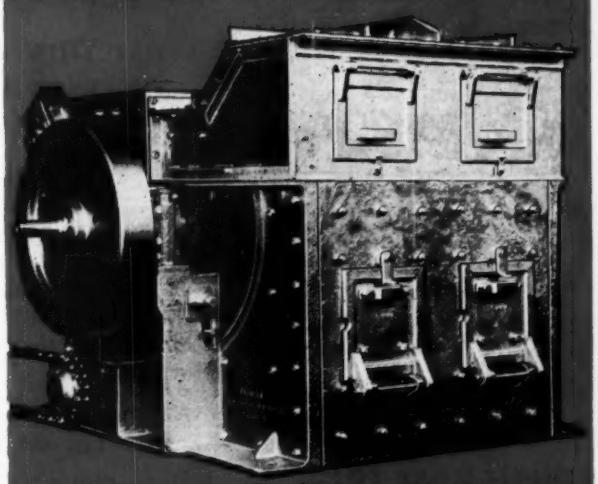

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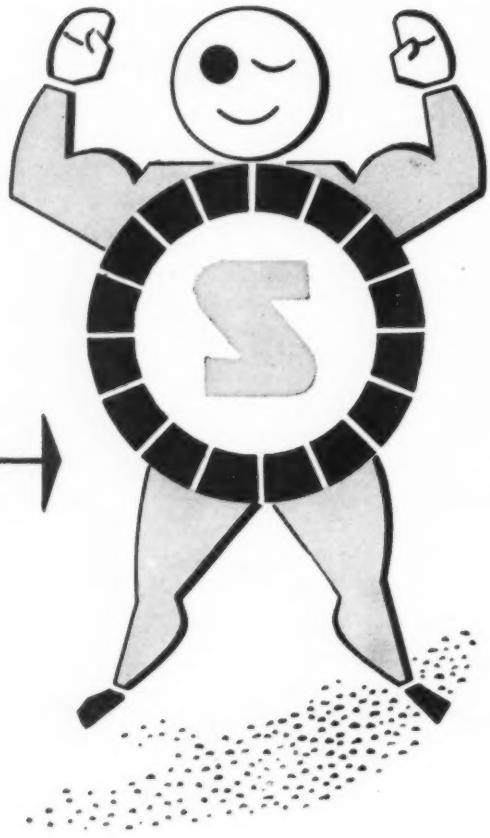

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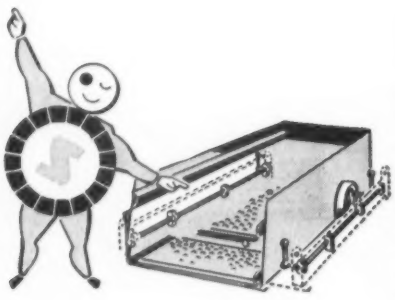

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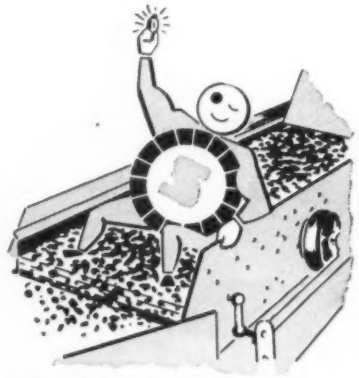

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Rock Wool

(Continued from page 100)

what the gas analysis is leaving the oxidizing zone, as that would reveal how much coke is burned by air in this zone and how much is lost later by reduction of CO_2 to CO. It seems, however, that not all of the incomplete combustion loss is due to reducing reaction in the higher regions of the cupola, although most of it is. The CO—CO_2 equilibrium factors dictate the presence of a very slight amount of CO present at the high temperature prevailing in the cupola, so if CO is present where oxygen is still high it will increase with lowering O concentrations.

In the oxidizing zone, the rate of oxygen disappearance and carbon dioxide formation is equal and each proportional to the oxygen content of the gas of any given point. That this does not change with increasing air velocity indicates that the rate of combustion is controlled not by the rate of chemical combination on the surface of the carbon, but by the rate of diffusion of the oxygen through the surface film of gas around each carbon particle. Doubling the air velocity approximately, but not quite, halves the thickness of this film; therefore, with the same oxygen concentration almost twice as much oxygen diffuses into the surface of the carbon, where the reaction is practically instantaneous.

The $C + O_2$ reaction taking place on the hearth is therefore limited only by diffusion and it is virtually instantaneous at the very high existing temperatures. Contact is all that is necessary and dispersion of the formed CO_2; the speedier the action, the greater will be the CO_2 and the lower the CO content of the coke burning zone.

This is not so in the case of $CO_2 + C = 2\ CO$ reaction which is limited by the reaction itself. Time here is a factor; the higher the rate of cupola operation the greater the speed of the gases, the lower will be the CO_2 conversion to CO, with a lower resulting wastage of coke and cooling of the charge.

At one plant CO formation was substantially higher than at another due, no doubt, to a lower rate of flow of the gases and longer contact of the gas with the oxygen hungry coke. The problem almost seems to dictate cupolas with inward sloping walls and highest permissible gas velocities. Top of the cupolas, properly charged, are very cool; to have them hotter would be of no aid, and probably cause harm, as reduction reaction would be active through a greater height.

With slag particularly, there is enough of sensible heat in the gases leaving the oxidizing zone to preheat the raw materials coming down the cupola shaft, and if it was not for the reduction reaction the charge would be much hotter throughout.

To condition coke so it will not burn until reaching the high temperature zone and thus avoid its reduction to CO would be a most worthy aim. To have larger coke may not work out so well because it would limit its surface in the combustion zone but trials should be conducted in that direction as well.

Dissociation of Water Vapor and Chemically-Held Water

The reaction of $H_2O + C = CO + H_2$, as it involves dissociation, is about half as slow as the $CO_2 + O$ reaction. However, cupola beds are thick, and although all of the moisture coming in with the air may not be dissociated, most of it will; how much of this in the combustion zone and how much in the reduction zone is the question. Chances are also that as hydrogen combines with the oxygen very readily, whatever hydrogen may be formed through dissociation of water by carbon is again quickly combined with oxygen to reform water, leaving CO free, which may repeat itself, thus increasing the harmful effect of moisture beyond what its slight amount of air may at first seem to indicate.

Another source of hydrogen is the volatile matter of the coke and as there is no oxygen in the zone where it leaves the coke, the hydrogen escapes unburned.

A still further source of hydrogen would be chemically combined water of stone, provided this escapes in a zone hot enough for the reaction $H_2O + C = CO + H_2$ to take place.

Blast furnace gases contain up to 4% of H so it must be present in the cupola gases as well.

Composition of Cupola Gases

From mere observation of a cupola top one would never be able to imagine the great waste which is taking place. It is only through gas analysis that this is revealed and then only if the sampling is done properly and correctly interpreted.

Unless the sampler is rather sure as to what it is all about, a sample should not be relied upon which was not obtained from at least 10-in. below the charge. One also should not rely on just one or even several samples; many must be taken from various points of the cupola cross-section.

Composition of the gas coming up the wall of the cupola will be entirely different from that coming up the center, or coming up as little as even 6 in. from the wall.

Depending on how the cupola is charged, if coke distribution is poor there may be a great difference in the composition from various cross-sections; if good there will be a greater uniformity and so in this respect also gas composition may be utilized as an operational criterion.

A gas analysis taken from samples over the cupola charge is generally useless. To avoid gas on the charging

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This is how P&H Hartop hard-surfacing electrodes cut equipment downtime, raise man-hour production, reduce maintenance costs

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And that's the beauty of Hartop. It helps you make repairs quickly and easily. You don't have to wait for repair parts. Your machinery stays on the job longer. Your man-hour production is greater. You see, worn parts hard-surfaced with these easy-to-use electrodes outwear new parts 2 to 3 times. That is why you get more work done and your costs are lower.

The Hartop series consists of four types of electrodes — with Rockwell C hardness ratings as follows: Hartop Brown, 35 to 40. Hartop Green, 45 to 50. Hartop Red, 50 to 55. Hartop Yellow, 58 to 63.

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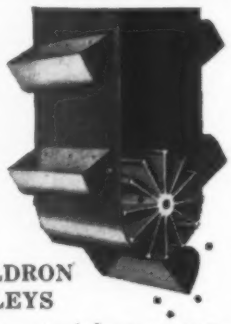

In handling any material on conveyors, almost always some of the material is carried between the face of the pulley and the pulley side of the belt. The wings of the Sprout-Waldron Belt Saver Pulley eliminate the grinding or crushing action common with conventional type pulleys, and the life of the belt is greatly extended.

Handling sticky materials presents a problem as they tend to build up on the solid face of the conventional type pulley. The design of the Belt Saver Pulley prevents this condition. No wonder Sprout-Waldron Belt Saver Pulleys are a "must" on the tail end of any belt conveyor or on the boot of any bucket and for the handling of sticky materials.

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floor, cupolas usually are under suction and it is difficult to make them so tight that air could not enter, which when it does, diffuses and dilutes the regular cupola gas stream.

In some of these tests the sampling tube was allowed to progress down with the charge. For this chromium and even water jacketed tubes were used and the purpose was to locate the point where CO was generated; that is, the point where coke was burned by CO_2 rather than by oxygen.

Samples vary a great deal in composition, showing that the gases going up the cupola are as poorly mixed as the solid materials charged to the cupola, in fact the latter is responsible for the first. When the cupola charge is loose or where there is an excess of coke, or probably an excess of stone, or either a low or high temperature streak, the gas coming up through the charge will be affected differently and have quite a different composition.

Sand and Gravel — Ready Mix Meetings

(Continued from page 96)

This research should include the study of the good and the bad features of all kinds of aggregates. Mr. Walker said the new laboratory facilities of the Association, at the University of Maryland, will probably be ready by next Spring. They have been especially designed for the purpose.

V. P. AHEARN, executive secretary, discussed progress in developing the Asociation's treatise on cost-accounting, which has been published in outline form. The Board decided that this was as far as it is advisable to go at this time.

The seriousness of the railway car supply problem was emphasized. Not only are open-top cars in short supply, but the condition of those distributed for loading sand and gravel is such that producers are frequently put to the expense of as much as $5 a car to make them serviceable. Mr. Ahearn did not see much chance of a better car supply, on a national basis, before 1950.

The effect of the present inflationary tendencies on freight rates has already been demonstrated, and Mr. Ahearn expressed the opinion that rates were likely to go still higher. (Since he spoke, the railways have asked for another increase.) By this process the railways are pricing themselves out of the sand and gravel carrying business. One producer described hauling sand and gravel 70 miles in 10-cu. yd. Diesel trucks. Another producer whose business was originally founded largely to furnish railway ballast, is moving sand and gravel long distances in 20-ton trucks in competition with the railways; and, he is contemplating buying a large fleet of trucks to get deeper into the carrying business.

The winners of the annual safety contest for 1947 were announced as the Marquette Cement Manufacturing Co. (Memphis, Tenn., sand and gravel plant) and the Pittsburgh Plate Glass Co.'s glass sand plant at Crystal City, Mo., which, incidentally, is an underground mining operation. Some 68 companies participated. The Board voted to take over from the U. S. Bureau of Mines the management and statistical work in connection with the safety contest. The belief was expressed that a wider participation by Association members could be obtained by so doing.

New developments in the owner-driver problem of leased trucks, are such, Mr. Ahearn said, as to call for a new study of the entire situation, especially in view of the fact that increases in railway freight rates are forcing more and more material into truck deliveries.

N.R.M.C.A. Program

C. "DOLLY" GRAY, Indianapolis, Ind., president, presided at the Board of the National Ready Mixed Concrete Association. After the usual routine business, the board adopted a resolution to authorize the election of an executive committee of four members in addition to the three officers (president, vice-president, secretary-treasurer). The four so elected are Albert R. Shiely, St. Paul, Minn.; R. K. Humphries, San Francisco, Calif.; Norman J. Fredericks, Detroit, Mich.; and Herbert G. Jahncke, New Orleans, La. Hitherto the Board has not had an executive committee.

As at the N.S.G.A. Board meeting, the regional meetings held under the auspices of local members, which are addressed by the Washington officers, were considered the best method of interesting new members.

The members of the Board were given a rough preliminary draft of "Recommended Practices for Sampling and Testing Ready-Mixed Concrete," for their later suggestions and criticisms. The possibility of a symposium on ready-mixed concrete at the next annual meeting of the American Concrete Institute was referred to by Stanton Walker, engineering director. There are some needed research problems peculiar to ready-mixed concrete, but practically all research on aggregates and concrete is of the same interest to ready-mixed concrete producers as to sand and gravel producers.

H. F. THOMSON, past-president, reported as chairman of the committee on motor truck chassis design. It has progressed to the point where it is feasible to discuss details of design with truck manufacturers in an effort to reduce the present high costs of repairs and maintenance.

V. P. AHEARN, executive secretary, discussed the importance of the industry's safety contest and its possibilities in promoting better public relations. A simplified form has been

(Continued on page 106)

"I didn't know you people made_____!"

Fill in to suit

We have been in business now for 58 years and yet quite often some good customer of our says — "Why, I didn't know you people made friction clutches!" Or the exclamation might cover skip hoist drives, car pullers, door hoists or any one of many other Jones products.

In dealing with our suppliers we often find ourselves in the same position. We establish certain buying habits and it sometimes comes as a shock to find that a firm right around the corner may have just the services or the products we need.

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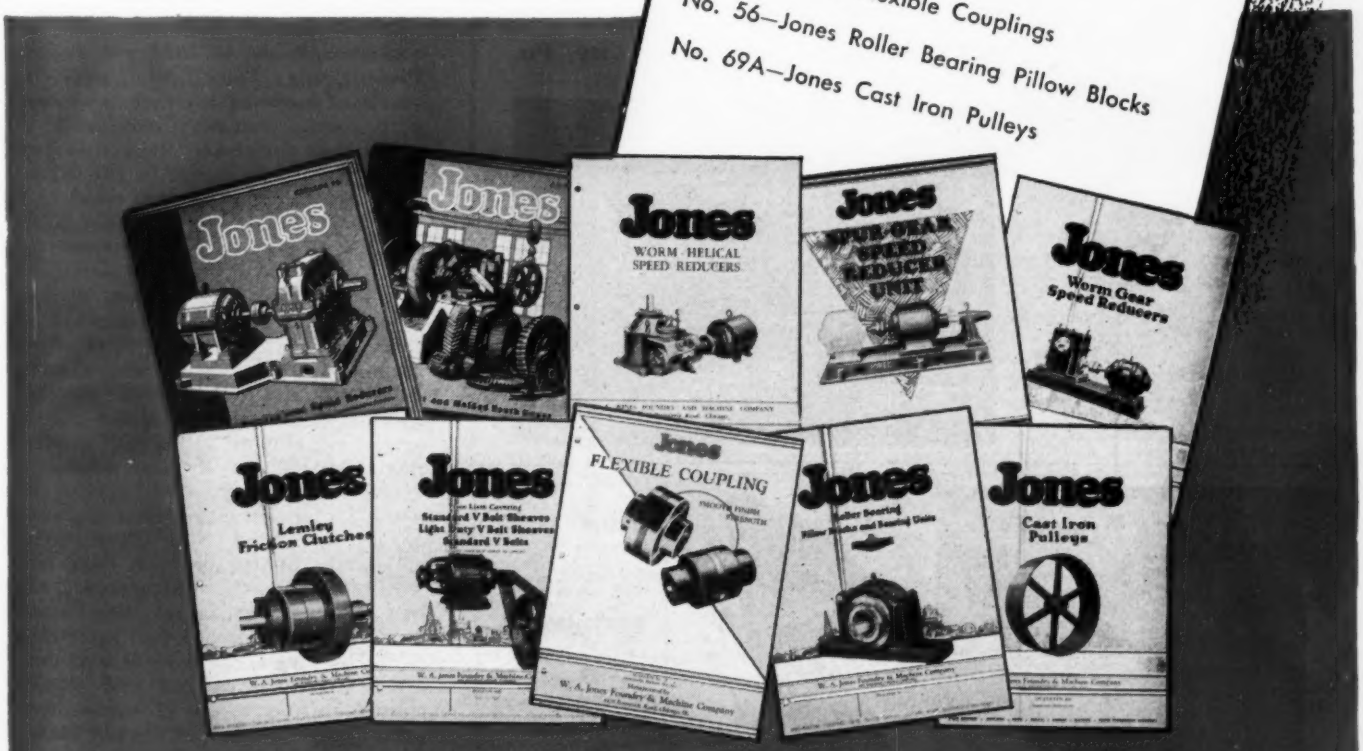
No. 60—Jones Friction Clutches
No. 58B—Jones V-Belt Sheaves
No. 78—Jones Flexible Couplings
No. 56—Jones Roller Bearing Pillow Blocks
No. 69A—Jones Cast Iron Pulleys



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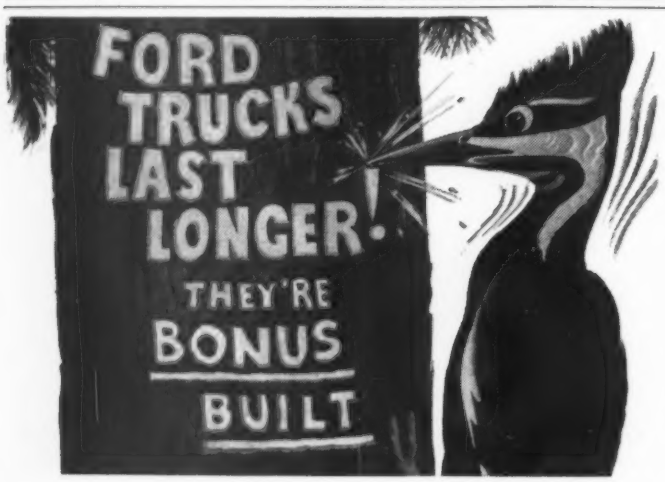

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Directors' Meetings

(Continued from page 104)

prepared, but still only 25 percent of the industry has made returns. Various members of the Board reinforced Mr. Ahearn's opinion of the importance of taking part in the safety contest.

The outline of cost-accounting methods prepared for the industry has been distributed, and, as was the case with the National Sand and Gravel Association's Board, it was voted to go no farther at this time.

ALEXANDER FOSTER, JR., Philadelphia, Penn., who is a member of Senator Capehart's advisory committee studying the effect of the U. S. Supreme Court's decision in the cement basing point case, said that up to that time the Federal Trade Commission had not issued any specific rules as to how the decision would be applied; and he said that apparently all the Senate Committee has in mind at this time is to get the decision and its application to industry in general, clarified.

V. P. AHEARN reviewed his correspondence with portland cement company executives on their attitude toward the ready-mixed concrete industry and the prospects of an adequate supply of cement in the near future. It will be the purpose of the N.R.M.C.A., Mr. Ahearn said, to maintain the friendliest attitude toward the cement industry, which is suffering from some very real, and perhaps unnecessary handicaps.

What some of these handicaps are was brought out by Robert C. Collins, Philadelphia, Penn., who gave the result of some of his own interviews with cement company executives. It seems that anticipated capacities have been seriously curtailed by the variety of cements many mills are required to produce, especially in the East where each state highway department has its own special cement set aside, not to mention the five varieties to meet standard A.S.T.M. specifications. Each change-over from manufacture of one cement to another causes several hours delay and hence several hundred barrels of production, which in the aggregate add up to several hundred thousand barrels in the course of months. Moreover, each special cement for the various state highway departments, the New York Board of Water Supply, the New York Port Authority, etc., ties up storage facilities and cuts production. The discussion led to suggestions that something might be done cooperatively with both other users of cement and cement manufacturers to see if better utilization may be made of cement manufacturing facilities.

Joint Board Meeting

Convention details required considerable discussion. It was decided to restrict the two conventions to four days only, instead of five, as has been recent practice. The first day will

be given over to meetings of the two Boards of Directors. Then there will be at least two sessions in which both Associations will participate, and also a joint luncheon with an outside speaker of note. All agreed that the discussions of operating and merchandising problems are among the best features of the conventions.

STANTON WALKER, director of engineering, described some of the broader features of his work—much of it, he explained, being outside the circle of Association membership with such organizations as the American Society for Testing Materials, the American Concrete Institute, the Highway Research Board, etc. Durability tests of concrete and aggregates are receiving a major part of the laboratory work.

V. P. AHEARN, executive secretary, described in some detail the most recent developments in labor relations rules, regulations and laws. In regard to the Supreme Court decision in the now famous "over-time on over-time decision" (Bay Ridge longshoremen's case), he said he did not anticipate much change in the law, but there probably will be some clarification.

A committee of the Association will be appointed to explore the possibility of a change in the internal revenue laws to permit percentage depletion, such as a number of mineral industries now have been allowed.

Registration

Following is the complete registration list, including guests:

Mr. and Mrs. F. E. Bellamy, Concrete Materials Co., Waterloo, Iowa.
H. D. Bellamy, Concrete Materials Co., Waterloo, Iowa; Concrete Materials & Const. Co., Cedar Rapids, Iowa.
W. A. Bliss, Dravo Corporation, Pittsburgh, Pa.
E. R. Booker, Rock, Sand & Gravel Producers, Association of Northern Calif., Northern California Ready Mixed Concrete and Materials Association, San Francisco, Calif.
Mr. and Mrs. C. E. Brady, B. V. Hedrick Gravel & Sand Co., Salisbury, N. C.
Mr. and Mrs. L. S. Brannan, Brannan Sand & Gravel Co., Denver, Colo.
J. A. Bullen, The Fountain Sand & Gravel Co., Pueblo, Colo.
Mr. and Mrs. H. P. Caldwell, Ohio River Sand Co., Louisville, Ky.
Mr. and Mrs. R. C. Collins, Warner Co., Philadelphia, Pa.
Mr. and Mrs. R. L. Collison, Palmer House, Chicago, Ill.
Mr. and Mrs. O. S. Conrades, St. Louis Material & Supply Co., St. Louis, Mo.
R. N. Coolidge, Cumberland River Sand Co., Nashville, Tenn.
A. E. Conover, Robins Conveyors Division, Hewitt-Robins, Inc., New York, N. Y.
Mr. and Mrs. F. D. Coppock, American Aggregates Corp., Greenville, Ohio.
Mr. and Mrs. F. P. Curtis, Lyman Richey Sand & Gravel Corp., Omaha, Nebr.
Mr. and Mrs. C. C. Deal, Deal Gravel Co., Elkhart, Ind.
B. F. Devine, Chain Belt Co., Milwaukee, Wis.
Mr. and Mrs. W. J. Doyle, Jr., Tulsa Sand Co., Tulsa, Okla.
Mr. and Mrs. G. M. Eady, Consumers Supply Co., Louisville, Ky.
Mr. and Mrs. R. C. Fletcher, Flint Crushed Gravel Co., Des Moines, Iowa.
Mr. and Mrs. A. Foster, Jr., Warner Co., Philadelphia, Pa.
Mr. Frank, The Fountain Sand & Gravel Co., Pueblo, Colo.
Mr. and Mrs. N. J. Fredericks, Koenig Coal & Supply Co., Detroit, Mich.
Mr. and Mrs. E. J. Goes, Koehring Co., Milwaukee, Wis.
Mr. and Mrs. C. "Dolly" Gray, Ready Mixed Concrete Corp., Indianapolis, Ind.

(Continued on page 108)

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Modern design—to provide high efficiency . . . reduce initial investment and operating costs.

FREE SERVICE Morris Dredging Pumps are built in standard, medium duty, and extra heavy types, in sizes from 4-inch to 48-inch, with electric motor, steam, Diesel or gasoline engine, or for belt, chain or gear drive. At no obligation on your part, Morris Engineers will be glad to study your needs and recommend the pump best suited for your purposes. Send in the necessary data today.

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SPEED is the great need of these busy times and that is what you are assured when you use a Sauerman Cableway or Scraper machine for your long haul material-handling work.

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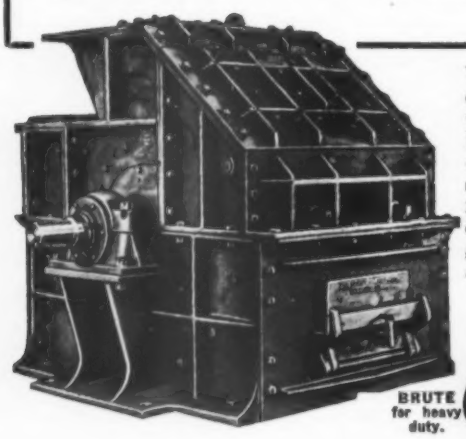

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Miss Betty L. Lawton, A. H. Smith, Branchville, Md.
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Mr. and Mrs. J. F. McCracken, American Builders Supply Co., Louisville, Ky.
Mr. and Mrs. R. McLean, Jaeger Machine Co., Columbus, Ohio.
Mr. and Mrs. Robt. Mitchell, Consolidated Rock Products Co., Los Angeles, Calif.
Mr. and Mrs. A. C. Modahl and Son, Modahl & Scott, Bloomington, Ill.
Mr. and Mrs. Wm. Moore, J. P. O'Connell Co., Boston, Mass.
J. W. Murphy, Union Sand & Gravel Co., Central Pre-Mix Concrete Co., Spokane, Wash.
Mr. and Mrs. C. R. Olson, Henry J. Kaiser Co., Oakland, Calif.
T. E. Popplewell, Fort Worth Sand & Gravel Co., Fort Worth, Texas; Lubbock Building Products, Lubbock, Texas.
R. F. Porter, Harry T. Campbell Sons Co., Towson, Md.
Mr. and Mrs. J. Prince, Stewart Sand & Material Co., Kansas City, Mo.
N. J. Redmond, Blue Diamond Corp., Los Angeles, Calif.
Mr. and Mrs. G. W. Renwick, Chicago Gravel Co., Chicago, Ill.
D. D. Reynolds, Boston Sand & Gravel Co., Boston, Mass.
G. F. Richards, Henry J. Kaiser Co., Oakland, Calif.
N. C. Rockwood, ROCK PRODUCTS, Chicago, Ill.
Mr. and Mrs. Eric Ryberg, Utah Sand & Gravel Corp., Salt Lake City, Utah.
Mr. and Mrs. A. R. Shiely, J. L. Shiely Co., Guaranteed Concrete Co., St. Paul, Minn.
Mr. and Mrs. C. W. Shirey, C. W. Shirey Co., Waterloo, Iowa.
Miss Vera Shirey, Waterloo, Iowa.
Mr. and Mrs. A. H. Smith, A. H. Smith, Branchville, Md.
Mr. and Mrs. H. N. Snyder, Buffalo Slag Co., Buffalo, N. Y.
Mr. and Mrs. F. P. Spratlen, Jr., Spratlen Materials, Inc., Ready Mixed Concrete Co., Denver, Colo.
Stephen Stepanian, The Arrow Sand & Gravel Co., Columbus, Ohio.
Mr. and Mrs. Sunderland, Omaha, Nebr.
Mr. and Mrs. M. E. Sundt, Albuquerque Gravel Products Co., Albuquerque, N. M.
Mr. and Mrs. W. F. Tews, Tews Lime & Cement Co., Milwaukee, Wis.
H. F. Thomson, St. Louis, Mo.
W. E. Trauffer, Pit & Quarry, Chicago, Ill.
Mr. and Mrs. R. V. Warren, Pa. Sand & Gravel Association; Western Pa. Sand & Gravel Assn., Pittsburgh, Pa.
Mr. and Mrs. R. E. Weaver, Lincoln Sand & Gravel Co., Lincoln, Ill.
V. P. Ahearn, Association Staff, Washington, D. C.
Mrs. Grace M. Sharp, Association Staff, Washington, D. C.
Stanton Walker, Association Staff, Washington, D. C.

Labor Relations

(Continued from page 59)

economies in production, and to exercise the powers expressly reserved for it in the management rights section of the contract."

Such arbitration cases are not of insignificant importance to any but the parties directly involved, but it seems to us that more can be learned from them on how to avoid pitfalls under our present labor laws, than by reading voluminous treatises on the techniques of management. At least that is our experience. The incidents related here can and do happen in many plants, and it is apparent that the only way they can be avoided is by being precise in the wording of the contract. Probably most employers believe it is an inherent right of management to try out a new employe, or put him on probation, until he has demonstrated his capacity for the job. Under present labor laws it is not an inherent right, but it can be made a contract right of management.

Statement of the Ownership, Management, Circulation, Etc., Required by the Acts of Congress of August 24, 1912, and March 3, 1933

Of ROCK PRODUCTS, published monthly at Chicago, Ill., for October 1, 1948.

State of Illinois, County of Cook, ss.

Before me, a notary public in and for the State and county aforesaid, personally appeared E. R. Gauley, who, having been duly sworn according to law, deposes and says that he is the Business Manager of ROCK PRODUCTS and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher — Maclean-Hunter Publishing Corp., 309 W. Jackson Blvd., Chicago 6, Ill.

Editor — Bror Nordberg, 309 W. Jackson Blvd., Chicago 6, Ill.

Managing Editor—Ralph S. Torgerson, 309 W. Jackson Blvd., Chicago 6, Ill.

Business Manager — E. R. Gauley, 309 W. Jackson Blvd., Chicago 6, Ill.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

Maclean-Hunter Publishing Corporation, 309 W. Jackson Blvd., Chicago 6, Ill. The stockholders of the Maclean-Hunter Publishing Corporation are E. R. Gauley, 808 Junior Terrace, Chicago 3, Ill.; J. L. Frazier, 2043 Orrington Ave., Evanston, Ill.; Col. J. B. Maclean, 7 Austin Terrace, Toronto, Ont., Canada; Horace T. Hunter, 120 Inglewood Drive, Toronto, Ont., Canada; The Maclean-Hunter Publishing Co., Ltd., 481 University Ave., Toronto, Ont., Canada.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.)

None.

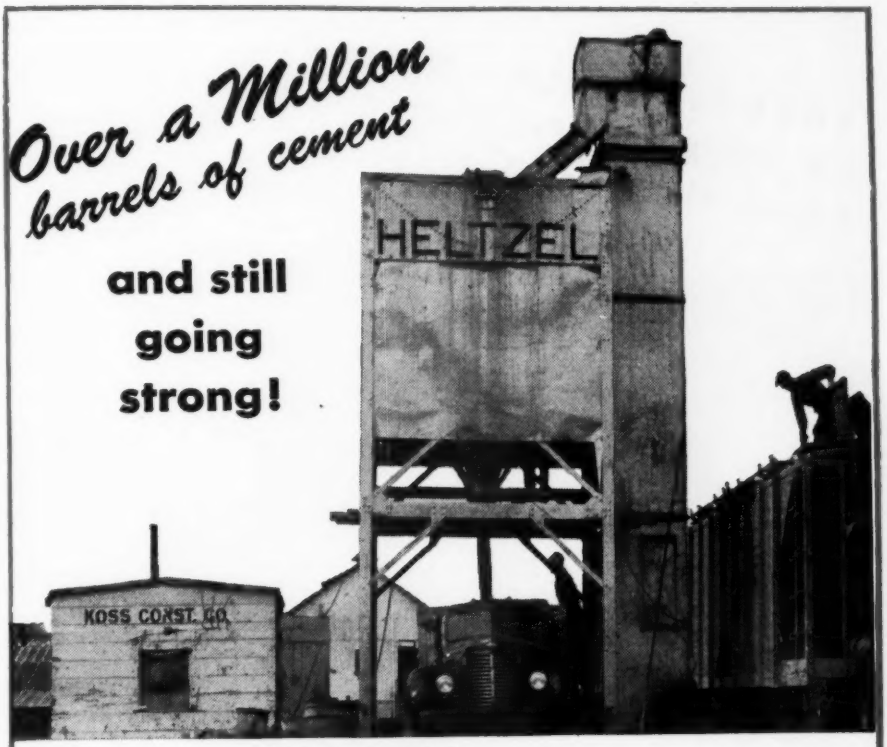
4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and that this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stocks, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or other wise, to paid subscribers during the twelve months preceding the date shown above is..... (This information is required from daily publications only.)

E. R. Gauley,
Business Manager

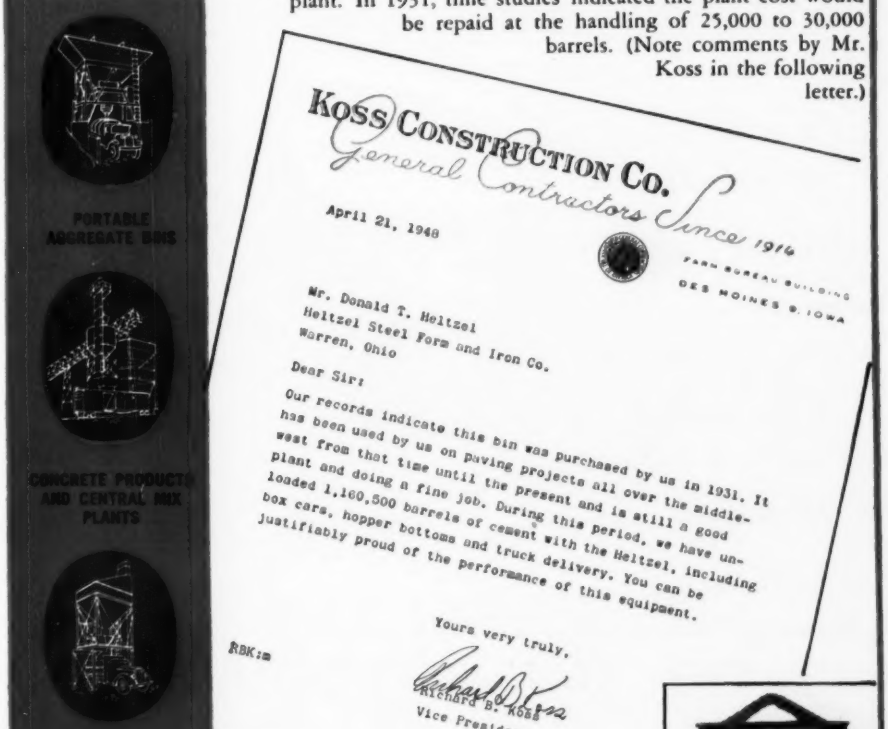
Sworn to and subscribed before me this 29th day of Sept., 1948.
[SEAL.]

M. E. Johnston
(My term expires October 22, 1949.)



VETERAN HELTZEL PLANT HAS REPAID ITS COST 42 TIMES OVER IN 17 YEARS . . .

• 1,160,500 barrels of cement have been unloaded by this plant. In 1931, time studies indicated the plant cost would be repaid at the handling of 25,000 to 30,000 barrels. (Note comments by Mr. Koss in the following letter.)



KOSS CONSTRUCTION CO.
General Contractors Since 1914
FARM BUREAU BUILDING
DES MOINES 8, IOWA

April 21, 1948

Mr. Donald T. Heltzel
Heltzel Steel Form and Iron Co.
Warren, Ohio

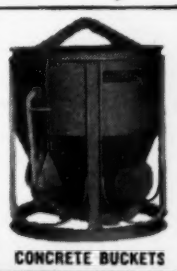
Dear Sir:

Our records indicate this bin was purchased by us in 1931. It has been used by us on paving projects all over the middle-west from that time until the present and is still a good plant and doing a fine job. During this period, we have unloaded 1,160,500 barrels of cement with the Heltzel, including box cars, hopper bottoms and truck delivery. You can be justifiably proud of the performance of this equipment.

Yours very truly,

RBK:m

Richard B. Koss
Vice President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Heltzel plants are products of specialized engineering, and constructed for lasting, trouble-free service. Your requirements for plants will be served best by Heltzel. Write for information and literature.

HELTZEL STEEL FORM & IRON CO.
WARREN, OHIO · U. S. A.

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IN "STRAIGHT-LINE" OPERATION
Athey ML4 MobiLoader

Using the "straight-line" overhead loading method, the Athey ML4 MobiLoader is proving itself a cost-cutter on a wide range of jobs. This fast, simple tractor loader handles practically all materials — crushed stone, gravel, sand, earth, iron ore, clay, coal, road materials, etc.

The MobiLoader digs at the front, travels in reverse to the long-haul unit or fill, and dumps its load overhead to the rear. No turning! No lost motion! Mounted on the husky D4 "Caterpillar" Tractor, the rugged MobiLoader speeds up every loading job.

Send Today for Full Facts!

Athey Products Corporation RP11
5631 W. 65th St.,
Chicago 38, Illinois

Please send complete details on Athey MobiLoaders

Name_____

Address_____

Town & State_____

Athey

Athey Products Corporation, Chicago 38, Illinois

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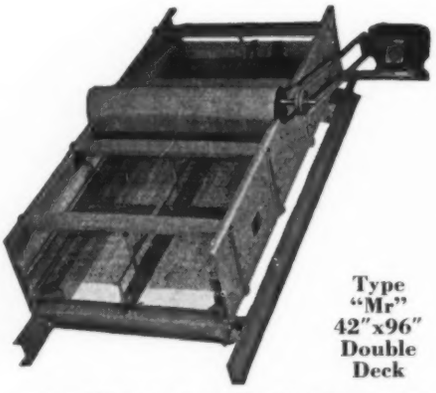
The all-around productive efficiency of these Screens is widely recognized.

Rugged, economical and efficient, they're your best bet for satisfactory screening!

Get acquainted with their design; write today for catalog No. 107 on Screens and Screening.



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Immediate Deliveries

SINTERING MACHINERY CORPORATION
Transportometer Division
SIXTY WALL TOWER New York 5, N. Y.

Manufacturers' News

Allis-Chalmers Mfg. Co., Milwaukee, Wis., has announced the promotion of A. J. Roubal from chief draftsman to staff development engineer of the basic industries machinery department. George O. Verch has been named chief draftsman of the crushing, cement and mining section, succeeding Mr. Roubal, and Eugene G. Wutke has been appointed assistant chief draftsman of the pyro-processing section to succeed Mr. Verch.

Bacon Pietsch Co., Inc., New York, N. Y. announces that Edward R. Boate has joined the engineering staff as assistant to the president. He was formerly chief engineer of the North Jersey Quarry Co., with which he was associated for 19 years. Bacon-Pietsch Co. are consultants in crusher design, stone, sand and gravel, transit-mix, bituminous concrete and batch plant layouts.

Edw. R. Boate

George Haiss Mfg. Co., Inc., New York, N. Y., division of Pettibone Mulliken Corp., Chicago, Ill., announces the appointment of S. DeVries as sales representative in the state of Connecticut.

General Motors Corp., Detroit, Mich., has announced the appointment of W. F. Armstrong as general manager of the Chevrolet Motor Division, succeeding the late Nicholas Dreystadt.

The Baker Industrial Truck Division of Baker-Raulang Co., Cleveland, Ohio, announces the appointment of Fred R. Ramsen as district sales representative for southern Illinois and eastern Missouri, with headquarters in St. Louis, also the appointment of W. B. Landers as district sales representative in southeast Texas, with offices in Houston.

Oliver United Filters, Inc., New York, N. Y., has placed Russell Runyon in charge of purchasing at the Hazleton, Penn., plant. He has been with the purchasing department in the Oakland, Calif., plant since 1936.

Hyster Co., Portland, Ore., has announced the appointment of Paul Brainard as head of the engineering standards department. He was formerly assistant supervisor of hoist design. R. E. Stiegele has been transferred to the general sales department in Portland, Ore., to handle special sales assignments for Philip Hill, general sales manager. W. R. Hunt will replace Mr. Stiegele as district representative in the southeastern territory. William Morrow has been appointed chief accountant for the Portland, Ore., office. He was formerly purchasing agent at the plant in Danville, Ill.

Caterpillar Tractor Co., Peoria, Ill., announces that Gerald W. Wilson and William F. Jordan have been appointed district representatives in the Eastern sales division. Mr. Wilson, who replaces F. S. Foster who has been named assistant eastern sales manager, will cover northern Georgia, South Carolina and eastern Tennessee. Mr. Jordan will represent the company in northern Ohio, Michigan and West Virginia. He succeeds R. E. Jeffries, who has joined Missouri Valley Machinery Co., Caterpillar distributor at Omaha.

Caterpillar Tractor Co., Peoria, Ill., has appointed The Inland Machinery Co., LeGrande, Ore., as distributor serving Oregon counties of Baker, Union, Wallowa, Grant and Harney. This territory was formerly served by Bunting Tractor Co., which retains as its territory 19 counties of Idaho, and Malheur County, Oregon.

Hamilton-Thomas Corp., Hamilton, Ohio, has been formed to operate Economy Pumps, Inc., Klipfel Mfg. Co., and Liberty Planers, Inc., manufacturing divisions of Hamilton-Thomas. Officers of the corporation are Richard Thomas, president; L. G. Thomas, executive vice-president; H. R. Ryan, vice-president; R. H. Thomas, Jr., vice-president; E. T. Drinkuth, secretary; and L. V. Thomas, treasurer.

Vanadium Corp. of America, New York, N. Y., has opened an aluminum alloy plant at Eddystone, Penn., under the supervision of Thomas N. Peck, director of the aluminum division.

Blaw-Knox Division, Blaw-Knox Co., Pittsburgh, Penn., announces that Arthur A. Levison, vice-president in charge of the construction equipment department, has been elected a director of the Construction Industries Association, Inc., for a three year term. This Association is affiliated with the American Road Builders' Association as the Manufacturers' Division. Mr. Levison was also recently elected to membership of the executive board of the Committee on Concrete and Concrete Aggregates of the American Society for Testing Materials.

Arthur Levison

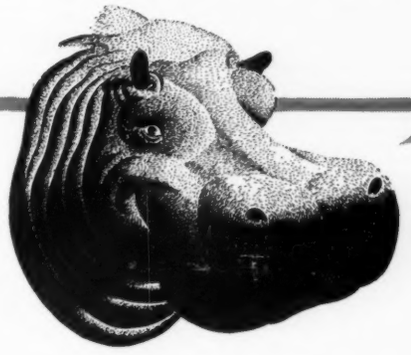
The Foxboro Co., Foxboro, Mass., has moved its Houston offices from the Sterling Building to the newly constructed office building at 2518 South Blvd., Houston, Texas.

Bemis Bro. Bag Co., St. Louis, Mo., announces that L. P. Littell has relinquished his direct selling responsibilities as manager of the Salt Lake City sales office but will remain in company services in an advisory capacity. He will be succeeded by Robert J. McDonald, formerly with the Denver office.

(Continued on page 112)

Ask me for a tip about

Blocks and Sheaves!



MR. HIPPOPOTAMUS leads a tough life . . . so he has wisely developed a thick, armor-like skin to stand the gaff. And that suggests a pointer about blocks and sheaves. They, too, are bumped, banged, scratched and battered . . . exposed to mud, water and the elements.

So American Hoist engineers developed *armored construction*—super-rugged design that withstands the worst kind of punishment. The American line includes many types of industrial wire rope blocks, in sizes from 1½ to 250 tons. They're *worth specifying!*

only "American" Blocks and Sheaves have ***armored construction***

Thick steel side plates, extended beyond sheave flanges, prevent breakage
Heavier pins and axles
Tough steel reinforcing straps
Sheaves of hard iron or alloy steel . . . thick flanges, precision shaped grooves
Self-lubricating bushings, bronze bushings, or anti-friction bearings
Oversize forged steel hooks and shackles

American Hoist
and DERRICK COMPANY

Plant No. 2: So. KEARNY, N.J. — St. Paul 1, Minnesota — *Sales Offices:* NEW YORK • PITTSBURGH • CHICAGO NEW ORLEANS • SAN FRANCISCO

HOISTS • DERRICKS • HANDIWINCH • GENUINE CROSBY CLIPS

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Genuine **CROSBY CLIPS**

For fastening wire rope, use genuine CROSBY CLIPS—Made of highest quality drop-forged steel, hot dip galvanized. To make sure you get *genuine* CROSBY CLIPS, look for the famous Red-U-Bolt. All sizes—⅛ to 3 inches. Distributors everywhere.

AMERICAN HANDIWINCH

Gives one man the power of a crew. HANDIWINCH weighs only 95 lbs. Can be carried and set up anywhere; handles lifting, loading and pulling jobs up to 5 tons. All steel construction, cut gears. Ask your distributor.

Cambridge Wire Cloth Co., Cambridge, Md., has opened a sales office in Houston, Texas, with Charles E. Shuman in charge as district sales engineer. Territory covered includes Texas, Oklahoma, Arkansas, Louisiana and Mexico. Announcement has also been made that Paul V. Thomure has been appointed district sales engineer for the St. Louis office and will cover the states of Missouri, southern Illinois, southern Indiana, Kentucky and Tennessee.

Raybestos-Manhattan, Inc., Passaic, N. J., has appointed S. R. Zimmerman, Jr., as director of friction material research and development at the company's plants in Stratford, Conn., Manheim, Penn., Passaic, N. J., and North Charleston, S. C.

Mack Trucks, Inc., New York, N. Y., has appointed A. W. Rice as auditor, replacing the late H. S. Conklin whose recent death ended a 36-year career with the company. Mr. Rice has been associated with Mack since 1921.

Farrel-Birmingham Co., Ansonia, Conn., has elected Robert M. Honegger, general manager of the Buffalo plant, as a member of the board of directors.

Hewitt-Robins, Inc., New York, N. Y., announces that C. W. Staacke has joined the company as a technical consultant and special assistant to Thomas Robins, Jr., president. Mr. Staacke was a member of the engineering staff of B. F. Goodrich Co. for 22 years.

Towmotor Corp., Cleveland, Ohio, has designed miniature fork lift trucks for use by plant engineers and other executives interested in planning effective and economical materials handling routes in factory or plant. The scale model trucks are available at a cost of $1.50 each. Requests should be addressed to the company.

Atlas Chain & Mfg. Co., Philadelphia, Penn., has announced the appointment of O. W. Schmidt as Central states district sales manager, with headquarters in Chicago, Ill.

R. G. LeTourneau, Inc., Peoria, Ill., has appointed Boze J. Livengood as district sales representative for the states of California, Arizona and Utah. Kenneth R. Ross has been named district sales representative for Georgia, Alabama, Florida and Tennessee, and Russell E. Dickerson for the states of Illinois, Indiana, Iowa and eastern Missouri. Charles L. White has been appointed sales engineer in the Tournarope sales department and will represent the states of Texas, New Mexico, Arizona, Utah and Oklahoma for Tournarope applications and sales.

The Goodyear Tire & Rubber Co., Akron, Ohio, recently celebrated its 50th anniversary with a three day program featuring dramatic reviews, an epic motion picture, business sessions, addresses by top officials and a banquet in the company's gymnasium. Special tribute was paid to F. A. Seiberling, 88 years old, who with his late brother, Charles W., founded the Goodyear organization. Also honored were two 50-year veterans, A. B. Cunnington and George Swartz, who have been continuously employed since 1898.

Frank G. Hough Co., Libertyville, Ill., has appointed G. A. Gilbertson as vice-president of the company. He was formerly assistant sales manager of the industrial power division of International Harvester Co. Raymond P. Wiggers, formerly with Towmotor Corp. and the Parker Appliance Corp., has been named advertising manager.

Atlas Powder Co., Wilmington, Del., announces that John F. Flippo, assistant manager of the Pittsburgh district sales office, has been transferred to the Chicago district sales office as assistant manager.

The Thew Shovel Co., Cleveland, Ohio, has completed its expansion program at the Elyria parts division. Included in the program were additions to plants Nos. 3 and 5, Elyria, Ohio. Officials are A. W. Wagner, manager of parts sales; N. W. Anderson, superintendent at Plant No. 3, and Cyril Brecknock, superintendent at Plant No. 5.

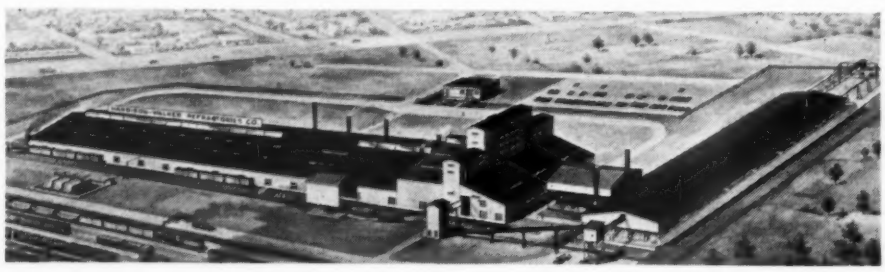
Hewitt-Robins, Inc., New York, N. Y., has moved its executive and sales offices to 370 Lexington Avenue, New York, N. Y., occupying the entire 18th floor, which will serve as eastern sales offices for the Hewitt Rubber and Restfoam divisions, Buffalo, N. Y., and Robins Conveyors and Engineers divisions located at Passaic, N. J. and New York City.

Barber-Greene Co., Aurora, Ill., announces the appointment of Fuchs-Clayton Machinery Co. as representatives in counties in the western end of Iowa along the Missouri river, and all of Nebraska. William A. Clayton is vice-president and general manager, and A. A. Fuchs is treasurer.

Allis-Chalmers Mfg. Co., Milwaukee, Wis., has named P. F. Bauer as manager of the newly formed central region of the general machinery division with headquarters in Cleveland, Ohio, comprising Cleveland, Toledo, Pittsburgh, Youngstown, Wheeling, Cincinnati, Detroit, Grand Rapids and Jackson. A sixth region has been organized under William Arthur, formerly Philadelphia district office manager, covering the Philadelphia, Wilkes-Barre, Baltimore, York, Richmond and Charleston offices. The York and Charleston branch offices, managed by G. E. Conn and R. L. Halsted, respectively, are now district offices. Frank Freyler, formerly manager of the Cincinnati district office, succeeds Mr. Arthur as Philadelphia district office manager. W. F. Daly succeeds Mr. Freyler at Cincinnati.

Bucyrus-Erie Co., South Milwaukee, Wis., has appointed the Nevada Equipment Service, Inc., Reno, Nev., as distributor for all of Nevada, with the exception of Clark, Elko, Whitepine

(Continued on page 114)



Airplane view of new basic refractories plant, Baltimore, Md.

Modern Refractories Plant

HARBISON-WALKER REFRACTORIES Co., Pittsburgh, Penn., recently invited a group of editors to inspect its new basic refractories plant at Baltimore, Md. Although the need for additional production facilities was recognized in 1940 or earlier, wartime restrictions held up building of the plant until 1946. Shortages and slow deliveries held up the building program so that 18 months were required to complete the plant that finally commenced operation in November, 1947. The site of the new plant was chosen for its accessibility to the Port of Baltimore for incoming shipments of raw materials and to freight yards that facilitate outgoing shipments of finished products.

So that the plant would incorporate all that had been learned in the operation of two basic refractory units as well as other plants producing all types of refractories, it was engineered and constructed by Harbison-Walker Refractories Co. personnel. Outstanding features in the design of this new plant include:

1. *Method of raw material handling and stockpiling.* All ore is delivered in hopper-bottom railroad cars, which dump to an apron feeder for delivery to the primary crusher. After material passes through the primary and secondary crushers, it is stocked in specially constructed covered compartments, which lessen segregation of fines and coarse material.

2. *Triplication of processing units to prevent contamination of different basic ores.* Until material is batched to the traveling weigh lorry, magnesite, olivine and chrome ore follow separate lines of flow so as to eliminate the possibility of contamination which might occur if unlike materials are processed through common equipment.

3. *Grain size control.* Dry pans are used to reduce the material to minus ¼-in. grain size, followed by a screening process. Ground and screened material is stored in compartments

fitted with baffles so that no section is over 3-ft. square. These storage bins total more than 100 in number.

4. *High pressure forming.* Bricks are formed on mechanical presses under pressure of 5,000 to 10,000 p.s.i.

5. *High burning temperature.* Kilns are of hollow wall construction, with drying air recirculated a number of times during the curing cycle.

6. *Minimize brick handling.* Through extensive use of pallets, handling of individual brick is minimized.

7. *Dust collection.* An extensive dust collection system has been installed in the plant with separate systems for each of three types of raw material.

8. *Quality control.* Samples are taken at all stages of the brick making process; and a complete laboratory aids in plant control of quality.

New Incorporations

Miles River Sand and Gravel Co., Beverly, Mass., has been incorporated by Joseph M. and R. Vitale with a capital of 500 shares, no par value.

Lowden Rock Products Co., Lowden, Iowa, has been organized with a capital stock of $40,000. Incorporators of the firm are: Robert Schneckloth, president; Margaret Schneckloth, vice president; and Raymond Schneckloth, secretary-treasurer.

Slough Sand & Gravel Co., Temple, Texas, has been incorporated by Aubrey Slough, Jessie K. Slough, and S. B. Dillard with a capital stock of $500.

Perry Sand and Gravel Co., Perry, Ohio, has been incorporated by Claude J. Parker, Irene M. Scider and Katherine Parsons. The company has issued 250 shares of no par common stock.

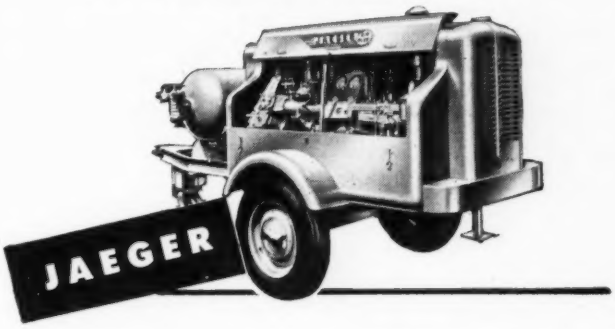
Hickman Sand & Gravel Corp., Hickman, Ky., has been chartered with $60,000 capital stock by C. A. Lattus, Wendell Choate, and Lyman W. Jackson.

Valley Sand and Gravel Co., West Milwaukee, Wis., has been incorporated to mine, quarry, and deal in stone, gravel, sand and other minerals. Minimum capital is listed at $1000 with 100 shares, no par value. Clement Vandenberg, Clarence A. Krause and Marvin H. Buchholz are the principals.

Festus Supply Co., Festus, Mo., has been incorporated to engage in quarrying, mining and the handling of construction supplies and equipment. Capital is listed at $1000 with 250 shares, par value $100. I. T. Aubuchon, N. Aubuchon and Wm. J. DeClue are the principals.

Upper Dayton View Sand and Gravel Co., Dayton, Ohio, has been incorporated with 100 shares, par value $100 common stock, according to Mel Case, secretary-treasurer, who said that the gravel pit was purchased from Ben Gradsky, former operator.

MORE AIR
TO RUN MORE TOOLS



with JAEGER "NEW STANDARD" SIZES

75 cfm — Instead of 60
125 cfm — Instead of 105
185 cfm — Instead of 160
250 cfm — Instead of 210
365 cfm — Instead of 315
600 cfm — Instead of 500

New Standard 125 ft. "Air Plus" can run 2 big breakers, or 3 medium breakers, 4 clay spades or 2 heavy sheeting drivers at full 90 lbs. pressure — do 30% to 40% more work than the same tools under mere 70 lbs. pressure.

Costs no more than inefficient "single breaker" 105 ft. compressors and uses no more fuel when not delivering more air.

All other new sizes are comparable. See your Jaeger distributor or get new Catalog JC-8.

THE JAEGER MACHINE CO., Columbus 16, Ohio

Regional Offices | 1504 Widener Bldg., Philadelphia 7 · 226 N. La Salle St., Chicago 1 · 235 American Life Bldg., Birmingham 1

WINNING POWER!

WISCONSIN HEAVY-DUTY *Air-Cooled* ENGINES

Four of a kind — winning power to spare in this hand! The same winning power you draw when you specify Wisconsin Air-Cooled Engines for your equipment . . . compact, heavy-duty singles in two types ranging from 2 to 9 hp.; twin-cylinder models from 7 to 13 hp., and V-type 4-cylinder engines from 15 to 30 hp.

All models are designed for heavy-duty service — delivering "Most Hp. Hours" of on-the-job service.

All models are extremely compact . . . to fit the machine as well as the job.

All models are built to one standard of top-quality excellence in design, materials and precision construction.

For "Winning Power", specify Wisconsin Air-Cooled Engines. Engineering data gladly supplied.

WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 14, WISCONSIN

Manufacturers' News

(Continued from page 112)

and Eureka counties; in California, Plumas, Alpine, part of Lassen county, and eastern portions of Sierra Nevada, Placer and Eldorado counties. The Lang Co., Inc., Salt Lake City, Utah, will continue to serve Elko, Whitepine and Eureka counties in Nevada, while Clark county will remain in the area of the Crook Co., Los Angeles, Calif. Soule' Equipment Co., Oakland, Calif., will continue to serve the northern half of California not covered by Nevada Equipment Service, Inc.

Ortner Co., Cincinnati, Ohio, is the name of a new company incorporated under the laws of the State of Ohio, with offices in the Terrace Plaza Bldg., Cincinnati, which will deal in the purchase, repair, conversion and sale of all types of railroad equipment and act as a sales agency for a number of railway supply manufacturers. The company will be headed by Joseph L. Ortner, retired vice-president of the Railway Accessories Co., which has been purchased by the Ortner Co. Associated with Mr. Ortner are his two sons, J. L. Ortner, Jr., vice-president, and R. C. Ortner, secretary and treasurer. L. J. Ortner will be eastern representative with offices in Buffalo, N. Y.

Hewitt-Robins, Inc., Buffalo, N. Y., has announced the appointment of F. L. Murdock & Co., Tulsa, Okla., as distributors of the Hewitt Rubber Division line of hose, conveyor and transmission belting, and packing.

LaPlant-Choate Mfg. Co., Inc., Cedar Rapids, Iowa, has appointed C. W. (Bill) Scholvin as district representative for New York, Pennsylvania, Maine, Maryland, New Hampshire, Connecticut, and the eastern part of Canada.

Chain Belt Co., Milwaukee, Wis., has appointed the Capital Machine & Welding Works, Sacramento, Calif., as a distributor of Baldwin-Rex roller chains.

Farrel-Birmingham Co., Inc., Ansonia, Conn., announces the appointment of Carl F. ter Weele as export manager with headquarters in New York, N. Y.

Marion Power Shovel Co., Marion, Ohio, has appointed John W. Bishop as sales representative in southern Indiana, western Kentucky and southeastern Illinois. Shaffer & Co. of Brazil, Ind., is the company's distributor in this area.

American Brake Shoe Co., New York, N. Y., has appointed William H. Starbuck as assistant general sales manager of the Kellogg Division. His headquarters will be in Rochester, N. Y.

Link-Belt Co., Chicago, Ill., has given Vivrett & Vivrett the contract for construction of a new plant in the 5100 block of Wayside Drive in Houston, Texas. J. A. Pitzinger is architect and engineer for the new plant.

Westinghouse Electric Corp., Bloomfield, N. J., announces the appointment of Russell E. Ebersole as general manager of lamp sales to succeed William J. Massey who has retired after 50 years of service with the lamp division.

Mack Trucks, Inc., New York, N. Y., has started construction of four new buildings as additions to its existing engine manufacturing plant at Plainfield, N. J., as well as alterations to present structures.

Gorman-Rupp Co., Mansfield, Ohio, announces the election of three new vice-presidents, namely: Warren E. Rupp, formerly chief engineer; Walter O. Buehler, who recently resigned as vice-president of the Carver Pump Co., and Kenneth H. Cadigan, former sales engineer of the company.

Improved Bucket Loader

N. P. NELSON IRON WORKS, INC., Clifton, N. J., has recently made several improvements in the model K5-B bucket loader. The new machine has a shorter base measurement, improving maneuverability, and the elevator discharge mechanism engineered to permit closer alongside truck loading and requiring less headroom. Facings on screw blades that feed material to the buckets are replaceable. Rated capacity for this machine is 2-cu. yd. per min.

The discharge conveyor swings in arc of 180 degrees. Base length is 11-ft., 11-in., and height is 12-ft. 8-in.

Highly maneuverable, 2-cu. yd. per min. bucket loader

Fractional-hp. Motor Switch

GENERAL ELECTRIC Co., Schenectady, N. Y. is now producing a new line of manual starting switches for fractional-hp. motors. These new

Fully enclosed manual starting switch for fractional-hp. motor

switches are offered in five different types: with general purpose enclosure; without enclosure; a combination units and selector switch; with cast iron enclosure for wet locations, and a similar type for dusty or hazardous locations. Featured in all five types is a molded base of moisture-resisting insulating material which mounts and encloses the mechanism and contacts. The switch handle moves to off position in case of overload. The switch incorporates a wheel-type movable contact that cleans as it rolls against the stationary contacts. All parts of these new units are rust-resisting, and with readily accessible wiring terminals on the top. The screws for fastening the back cover are attached to the cover to prevent their being lost.

Hardfacing Welding Rods

AMERICAN BRAKE SHOE Co., New York, N. Y., recently announced two new tungsten carbide welding rods for hardsurfacing and reclamation applications: Tube Tungsite and Tungrod. The first consists of tungsten carbide particles of various screen sizes enclosed in a steel tube. When applied as a welding rod, the steel tube melts easily, forming a molten matrix; but since the particles of metal inside the tube have an extremely high melting point, they do not melt but remain in suspension.

The second, Tungrod, differs from the first in that the particles inside the tube are minus 40 mesh, while the other tube contains particles from minus 5 to plus 40 mesh. Tungrod is supplied in two forms: bare for oxyacetylene use and coated for electric applications. It may be applied more thinly and to thinner base metals.

INDUSTRY NEWS

Availability of Wire for Concrete Pipe Reinforcing

IN A RECENT LETTER from T. J. Kauer, managing director, Wire Reinforcing Institute, to the American Concrete Pipe Association, the situation concerning supply of steel wire mesh and what the manufacturers are doing to alleviate it is set forth. Reasons for the present apparent shortage are listed, principal of which is the fact that current demand far outstrips that of only a year ago. In June, 1948, shipments of wire reinforcing mesh to the pipe industry exceeded shipments in June 1947, by 2,500 tons. But earlier this year, wire mesh demand fell off over that of the same period in 1947 by a full 25 percent, with the result that such fluctuation makes the supply problem impossible of easy solution. Mr. Kauer assured the concrete pipe industry that the makers of steel wire mesh for pipe reinforcement were doing all in their power to provide the required mesh.

As a further aid in alleviating the welded wire fabric shortage, the National Bureau of Standards of the U. S. Department of Commerce has issued an illustrated pamphlet titled Simplified Practice Recommendation R234-48, listing 63 approved styles of fabric which can replace the 311 styles now in use. This release may be purchased for five cents from the Government Printing Office, Washington 25, D. C.

Concrete Pipe Contract

LOCK JOINT PIPE CO., Denver, Colo., has been granted a contract for $2,843,762 to furnish the 90-in. pre-cast concrete pipe for the 10-mile conduit from the mouth of Platte Cañon to Marston Lake on the southwestern outskirts of Denver, William M. Freeman, district manager of the Pipe company has disclosed. The pipe will take about 5000 tons of reinforcing steel, 70,000 bbls. of cement and about 50,000 yds. of sand and gravel, he said.

Concrete Products Group to Meet

THE SOUTHEASTERN STATES MEETING of the National Concrete Masonry Association will be held November 8-10 at Miami Beach, Fla., Hotel Richter, it has been announced. This is the fourth meeting of its kind, the first three of which were held at Knoxville, Tenn., Brimingham, Ala., and New Orleans, La., respectively.

Increases Block Production

ANCHOR CONCRETE PRODUCTS, INC., Cheektowaga, N. Y., which last year shifted operations to a new $350,000 factory, now has a production greater than that of any other single concrete block plant in the country, according to President Frederick W. Reinhold. The company's output in 1945 was 1,250,000 units. In 1946, output rose to 2,250,000 units, and in 1947 production hit the 4,000,000 mark. This year will approximate 5,000,000 units, Mr. Reinhold said, and added that with adequate materials supplies, the company could produce 10,000,000 units per year.

Transit Mix Truck Damaged by Train

CERTIFIED CONCRETE CO., East Chicago, Ill., recently had one of its cement mixer trucks damaged when the truck, carrying eight tons of concrete, stalled on railroad tracks at Whiting, Ind., and was struck by the Pennsylvania Railroad's Broadway Limited, en route to Chicago.

The train demolished the truck's cab, and the loaded transit mixer was swung by the collision into the side of the train, damaging several cars. The driver, who investigated when the truck stalled, said he found the drive shaft had been broken, and had attempted to flag down the approaching train to no avail.

Block for Big Apartment Project

B. B. MCCORMICK AND SONS has opened the first group of completed units in its $3,000,000 project of McCormick Apartments at Jacksonville, Beach, Fla. The project, started last November, will be ready for occupancy this year, and consists of 354 apartments, arranged in 48 buildings. Materials used in construction include 600,000 concrete block, 400,000 brick, and 50,000 bbls. of cement, according to a release from the company.

Concrete Pipe Production on Increase

DESPITE the fact that concrete pipe is being produced in greater quantities than ever before and that the industry expects to surpass its 1947 production of approximately 6,000,000 tons, most plants are not working at maximum capacity, according to J. A. Dunn, president of the American Concrete Pipe Association. Reasons for this were given as shortages of steel for reinforcing purposes and inability to secure adequate stocks of cement. Mr. Dunn also is president of Hume Pipe of New England, Inc., Swampscott, Mass.

GAIL B. HAMER, president, Dayton Builders Supply Co., and company associates have purchased the interest of Ben Cochran in the Concrete Masonry Units Co., Hamilton, Ohio. Plant expansion and addition of new machinery are planned.

BUILDERS BLOCK AND SUPPLY CO. is under construction near Freehold, N. J., for the production of cinder and concrete block. Capacity will be 3000 block per day. Estimated cost of the project, fully equipped, is $35,000. David Metz and Edmund Blumenthal are the owners.

GRANITE CONCRETE BLOCK CO., Elyria, Ohio has added pumice block to its line of concrete products, it has been announced. The pumice is being obtained from New Mexico.

BUILDERS CONCRETE BLOCK AND SUPPLY CO., Hillsboro, Mo., has started production of concrete block, plain, colored, waterproof and plaster finishes.

CLINTON CONSTRUCTION CO., Wilmington, Ohio, has announced that while production reached an all-time high of 223,000 concrete block during the month of June, the company still is unable to meet demand. Last year, the largest production was 157,000 blocks in October, officials said. Although production is continuing at the rate of 6000 block per day, the 240,000 block surplus on March 1 and daily production since then has been used up.

PITTSFIELD READY MIXED CONCRETE CO. has started operations at Pittsfield, Ill., with Marshall Chiasson as superintendent. The firm will furnish concrete for a new REA building being erected in the area.

WESTERN CONCRETE PRODUCTS CO., Hastings, Neb., has filed articles of incorporation showing a capital stock of $75,000. H. L. Sherwood, W. M. Stoner, Sr., and W. M. Stoner, Jr. are the principals.

PLEASANT GROVE PLANT, United Concrete Pipe Co., Los Angeles, Calif., has been completed to furnish materials for remaining work on the Salt Lake aqueduct of the Provo river project, M. S. Moss, plant superintendent, has announced.

ALFRED JOHNSON AND HUBERT JACOBSON, Aitkin, Minn., have purchased the Polaris Concrete Products plant as part of an expansion program for the Midwest Brikcrete Company which they own and operate. The purchase will double present space. Midwest Brikcrete Co. manufactures block, bricks, and ready-mixed concrete, and may later add drain tile to its list of products.

VALLEY READY-MIX CONCRETE CO., Raymondville, Tex., announces construction of a new concrete mixing plant at an estimated cost of $60,000. Hill Cocke is president of the company.

HARRY WELLS, manager and part owner of the Baxter Cement Products Co., Baxter Springs, Kan., has purchased the interest of A. K. Blosser in the company, making Mr. Wells the sole owner.

VIRGIL STRANGE AND HOWARD PLANK, Hutchinson, Kan., have been given a franchise for Perma-Stone, and have established the Perma-Stone Better Homes Co. at Hutchinson.

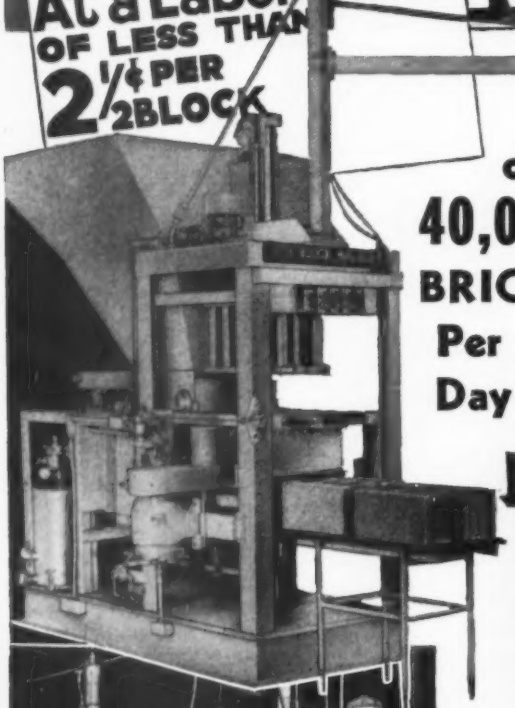
The BLOCK MACHINE the Entire Industry Is RAVING ABOUT

3840 8X8X16" Blocks Per Day At a Labor Cost OF LESS THAN 2½¢ PER 2 BLOCK

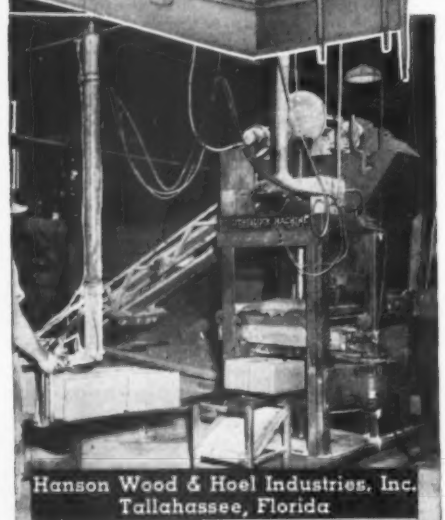
or 40,000 BRICKS Per Day

Because the Lith-I-Block Machine with its superior production features is the result of twelve years research and three years actual daily production, cement products manufacturers in every part of the United States and foreign countries are really heralding the praises of Lith-I-Block Machine operation costs. This machine is a plain pallet vibrating stripper. It offers many advantages over ordinary makes — quiet operation, continually clean pallets, size changes in as little as fifteen minutes, easily adjustable vibrating cycle, automatic pallet feed, instantly adjustable feed timing, off bearing cycle reduced to one-half of production cycle and simple installation. It will make all standard sizes of block, brick and chimney block.

ASK THE MAN WHO OWNS ONE



Idaho Masonry Products Company
Twin Falls, Idaho



Hanson Wood & Hoel Industries, Inc.
Tallahassee, Florida

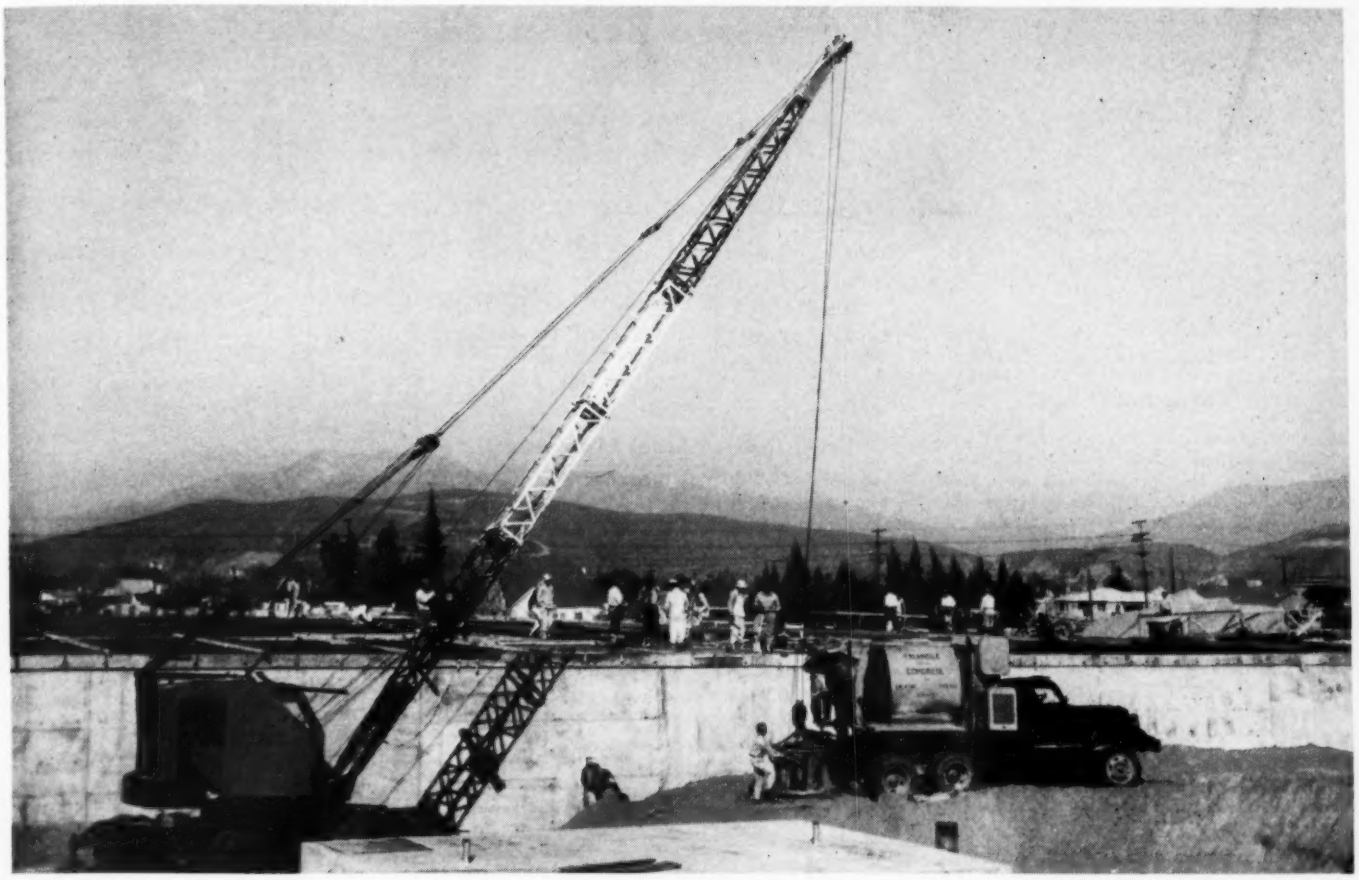
We invite you to write any or all of the concerns illustrated, or better still, write us for an additional list of Lith-I-Block Machine users. You will get your most complete evidence by "Asking the man who owns one." They have experienced that labor costs, even including night maintenance men, have been reduced to less than 2½c per block for day in and day out production. Write for additional information and prices to Lith-I-Bar Company, Box 11 RP Holland, Michigan.

Mich. Certified Concrete Prod. Co.
Grand Rapids, Michigan

Badgett Concrete Products
Mount Airy, N. C.

LITH-I-BLOCK Machine

U.S. and Foreign Pats. Pending
Trade Name Reg. LITH-I-BAR Co. Holland, Michigan, U.S.A.



Construction scene of 10,000,000-gal. storage reservoir in California where transit-mixed, air-entrained concrete was used exclusively

Save Cement With Air-Entrained Concrete

Two large West Coast construction jobs are poured with ready mixed concrete delivered by Triangle Certified Concrete, Inc., San Bernardino, Calif.

Two recently completed construction jobs on the Pacific Coast for which concrete was supplied by Triangle Certified Concrete, Inc., San Bernardino, Calif., should be of interest to the ready mixed concrete industry. On the Coast at this writing, portland cement is very hard to get and any savings that can be made in the use of that commodity mean more continuous output for the concrete producer. Pozzolith was suggested as a possible means of saving cement and yet retaining required strengths.

One of the jobs was the domestic water supply storage reservoir located at Marshall and Waterman avenues in San Bernardino. Water is pumped into the reservoir but flows out by gravity. It contains 6000-cu. yds. of Pozzolith-concrete with an average air content of 2.3 percent. The bottom or floor slab is of 6-in. concrete, with a deck slab 8-in. thick and battered walls from 12-in. at the top to 18-in.. thick at the bottom. Supporting the roof deck are 187 columns each 18-in. in diameter. The top decks will be covered with soil and the area landscaped. Walls are 16-ft. high, and the crown of the top deck is 18½-ft. high, giving it a slightly domed effect. The reservoir will hold 10,000,000 gal. of water and is 359-ft. long and 239-ft. wide.

Air-Entraining Concrete Mix

On this job 5-sack concrete was used on the floor and 5½-sack on the walls and roof decks. All the concrete poured comprised gravel and local sand aggregates with 1½-in. being the top size. Average strengths for 28-day concrete were in the 4200-lb. range. Some of the results of actual tests were as follows:

Walls . . 5195, 4510, 4680 and 4135 lbs.
Deck slab . . . . . 4610, 4095 lbs.
Floor . . . . . 4425 lbs.

The floors are provided with copper and tar seals at the joints with drain tile under the concrete for taking care of any seepage.

Inspection of the job shows it to be remarkably free from pockets, with none now visible. Walter Ansel, superintendent for the Bakker Construction Co., who supervised the job, said that the concrete was very easy to handle, flowed around the reinforcing better and required less vibration to get it into place.

Work was started in 1947 and completed in June of 1948. Bard Livingston was superintendent for the water company, and L. A. Hosegood, engineer. B. V. Steel, superintendent for the Triangle Certified Concrete Co., Inc., represented his company on the job.

The second job was the Sun Building, being erected for the Sun Telegram Co., by J. N. Robinson, general contractor. The building, located at 5th and "D" street, is a two-story structure. On this job 6.3-sack pozzolith-concrete was used for the walls, with 5.5 and 6.0-sack concrete for the floors and other parts of the building. Type "I" Pozzolith at the rate of 0.6-lb. was first used, and later Type 4-A at the rate of 0.4-lb. Some 1½-in. gravel was used, but

(Continued on page 132)

Fig. 1: Cast iron joint rings which also function as end rings during the spinning of the concrete core. Longitudinal steel wire loops are hooked over the lugs after the joint rings are set in each end of the molds, and the wire loops are prestressed before the concrete cores are spun

Prestressed Reinforced

CONCRETE PRESSURE PIPE

By M. W. LOVING*

PRESTRESSED reinforced concrete pressure pipe, of excellent quality, is being manufactured for the Cuban Government by the Pontusco Corporation of Cuba at Cotorro, near Havana, Cuba. This is a joint venture of the United States Pipe and Foundry Company, Burlington, N. J., and Pont-A-Mousson, Nancy, France; both firms are primarily engaged in the manufacture of cast iron water pipe in the United States and France, respectively.

The pipe for the Cuban Government are made in diameters of 24, 30 and 36 in. and in lengths of 22 ft. Designed for a working pressure of 150 p.s.i., full-sized pipe are tested to 250 p.s.i., without leakage through the concrete cores—before the concrete cover-coat is applied. The concrete cores for the 24-in. diameter pipe are only 1.5 in. thick; the 30-in. are 1.75 in. thick and the 36-in. pipe are 1.9 in. in thickness. After the cores are prestressed longitudinally and circumferentially, a concrete cover-coat is mechanically placed on each diameter pipe, with a thickness of about 0.75 in. The cut-section, Fig. 2, shows how the pipe are made.

Fig. 2: A cut-section from a 24-in. diameter prestressed concrete pipe; note the uniform spacing of the circumferential and longitudinal steel wire. Concrete cover-coat is vibrated under and around the wire, and is thoroughly bonded to the concrete core

Longitudinal Steel Members

Concrete cores are made by the centrifugal process in two-piece moulds with cast iron end-rings, which also function as joint-rings. Lugs are provided on the end-rings, Fig. 1, over which the steel wire loops are fastened. The 0.218 in. diameter, hot-rolled wire is received in rolls, and is straightened with a machine similar in design to those used in the manufacture of wire nails. Cut to the required length, the two ends of the wire are butt-welded and these welds on test equal the strength of the wire. The loops are stretched on a machine of unique design, with the weld near the center of the loop. With the end-rings in position at each end of the mold, a workman hooks one end of the loop over the lug of the end ring; then with a mechanical "shoe-buttoner" the other end of the loop is hooked over the corresponding lug on the end-ring at the other end of the mold; this operation induces a stress of about 40,000 p.s.i. in the longitudinal members.

Manufacture of the Concrete Cores

After all the longitudinal steel members are placed in position and prestressed as above described, the molds are placed on the trunnions of the spinner. Concrete of a plastic consistency, very thoroughly mixed, and consisting of standard portland cement, sand and carefully graded crushed limestone and water, is placed in the mold with a mechanical charger while it is revolving at a low speed. Only enough concrete is first placed in the mold to produce one-half the shell thickness of the core and this is spun for five minutes. Then the rest of the concrete is placed in the mold, and is spun at a peripheral (rim) speed of about 3000 f.p.m.; this requires about 20 minutes to densify the concrete shell of the core. Two-phase spinning is necessary where the aggregates vary in specific gravity-weight in terms of water. Thus the concrete is very dense and impermeable and uniform in texture; by carefully examining Fig. 2, one can see how excellent the concrete is. Made of a very rich mixture, this concrete, after curing and ageing exceeds 13,000 p.s.i. in compressive strength. While this kind of concrete has been made in Australia, England, France and Sweden on a commercial basis for many years, it is seldom made in the United States. The steel mold, while spinning one of the concrete cores at Cotorro, Cuba, is shown in Fig. 3.

The molds are then removed from the spinner, and two cores are made in one operation (see Fig. 3), and transported to the curing rooms. While still in the molds, the concrete cores are cured with steam at a temperature of about 150 deg. F. and a relative humidity of 100 per cent for 4.5 hours. From the curing room, the cores still in the mold, are taken to the stripping shed and after the spinning rings are removed and the latch-nuts of the molds are released by workmen, the two-piece molds are removed with the mechanical tongs shown in Fig. 4. The concrete cores are then transported to the curing yard for an additional two-week curing period. Curing rooms and the industrial track for transporting the pipe can be seen in Figs. 6 and 7; the curing yard, in part, is also shown.

Circumferential Prestressing

After the two-weeks curing period, the concrete cores are ready for the stress-winding with oil-tempered, spring steel wire. The diameter of the wire used at Cotorro is 0.187 in. and has an ultimate strength of from 205,000 to 225,000 p.s.i.; the yield point ranges from 164,000 to 185,000 p.s.i. Cores are wound with this wire under a tensile stress of 100,000 p.s.i., which is the designed working stress for the steel. The equipment used for this operation is of special design, because of the long length of the pipe in proportion to its diameter. To avoid bending stresses in the concrete core, near the center, during the winding operation—the wire is wound in such a way that the stress on the core is the same from both sides. Even if space was available, it would be very difficult even with pictures to explain this unique operation; besides I would hesitate to disclose too many details of this excellent equipment. The helical wires are very securely fastened to the cast iron joint-rings and the wire is wound at a uniform pitch.

The Concrete Cover-Coat

While in the horizontal position, the pipe are provided with a concrete cover-coat, Fig. 8, placed with a vibro-

*Consulting engineer

Pontusco Corporation of Cuba manufactures pipe in diameters from 24-in. to 36-in. and in lengths of 22 ft. Concrete cores for the 36-in. pipe are only 1.9 in. thick. After cores are prestressed longitudinally and horizontally, a concrete cover coat of 0.75 in. is placed mechanically

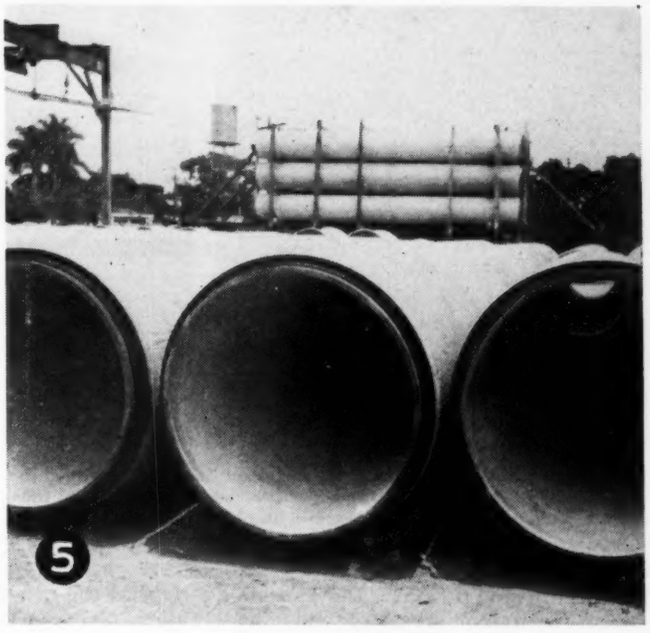


Fig. 5: Close view of the ends of three 30-in. dia. prestressed concrete pipe and a loaded freight car to the rear

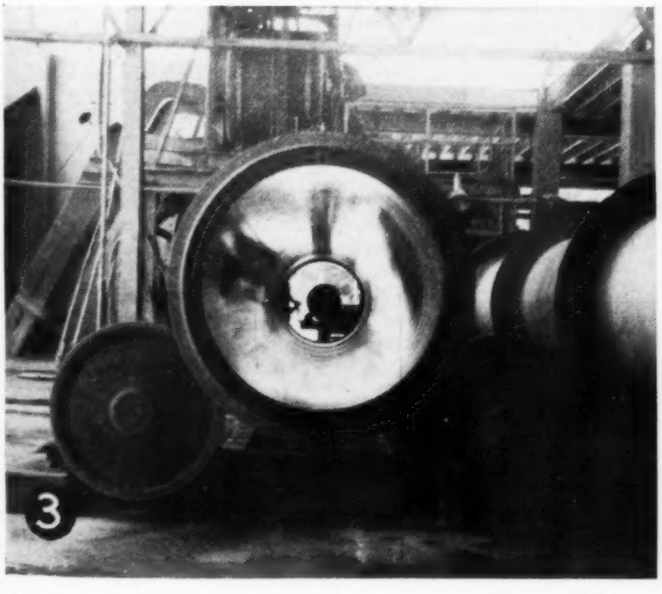
buttering machine. This equipment is so designed and efficiently operated that the cover-coat is forced under and around the stress-wound steel wire on the external surface of the concrete core. The bond of the cover-coat to the concrete core is perfect; this can be demonstrated at any time by trying to chip the cover-coat from the core and by examining Fig. 2.

The most important aspect, however, was the entire absence of crazing and shrinkage cracks from the surfaces of the pipe, some of which had been exposed in the storage yard for more than six months. This was of particular interest, because the same end results were obtained by the Lewistown Concrete Pipe Co., Hillside, Ill., from 1938 to 1943 in the manufacture of prestressed reinforced concrete water pipe for Hammond, Ind.; Chicago, Ill., and the Standard Oil Company of Indiana, Wood River, Ill. One of the most impressive pictures taken by the author at Cotorro, May 19, 1948, is shown as Fig. 5, and is a close view of the ends of three pipe, with a loaded freight car in the background.

Specials

All specials are made of sheet steel, not prestressed, and the working stress of the specials is 12,500 p.s.i. The excellent concrete linings and coatings of the specials shown in Fig. 9 were done by hand methods of Cuban workmen, trained and supervised by the French Concrete Engineers. The joint rings of the specials are made with steel and are welded to the sheet steel diaphragm; the steel joint rings have the same shape as the cast iron male and female joint rings, Fig. 10, so that when they are installed in a pipe line, the rubber gaskets effect a tight seal.

A typical section of the Pontusco joint assembly is shown in Fig. 10; from this you can see how the stress-wound wire is fastened to the cast iron joint rings at each end of the pipe. The longitudinal steel members are placed in the center of the concrete core. This excellent, self-centering joint provides for both expansion and contraction of the pipe line, due to the wide variation of the temperature of the water conveyed summer to winter. When and if the pipe lines settle or if there is movement of the soil mass, within practical limits, through which they must be constructed, this flexible joint will remain tight. Because the section of the rubber gasket is a truncated triangle it will be compressed tighter the higher the internal hydrostatic pressure. The inner surfaces of the joint rings are machined to true circles and when the



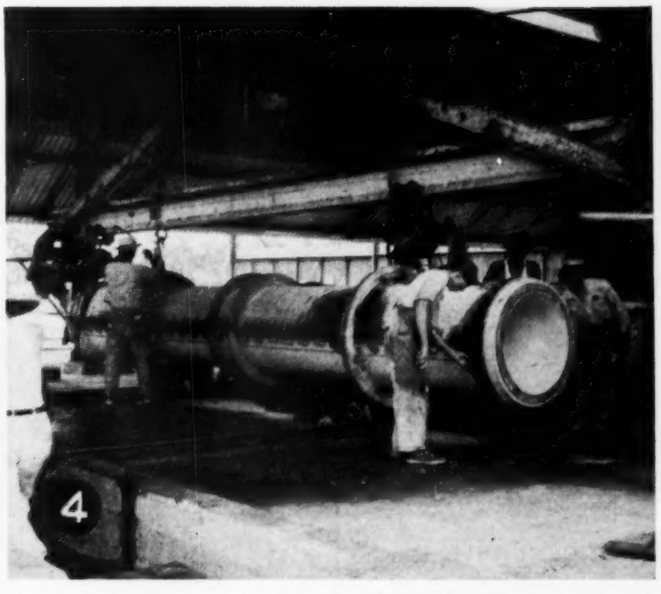


Fig. 3: Spinning two 30-in. dia. and 22-ft. long concrete cores in one operation. The charger can be seen at the far end of the mold which is spinning at a peripheral (rim) speed of about 3000 f.p.m. Fig. 4: Workmen removing spinning rings and latch-nuts of the two-piece molds. The large mechanical tongs are used to handle the molds and the concrete cores

Fig. 6: Steam curing rooms in the background are provided with lift-up doors at each end. Concrete cores, while in the molds, are steam cured at a temperature of about 150 deg. F., and a relative humidity of 100 percent for 4.5 hours. Fig. 7: Depressed tracks, well-drained, are used throughout the plant for transporting the cores and the finished pipe. A 36-in. dia. and 22-ft. long concrete core is shown at the left. Fig. 8: Close-up of one of the cast iron joint rings after it was painted and the concrete cover-coat applied

pipe are drawn together, the gaskets are uniformly compressed around the periphery of the joint—thus blow-outs are impossible. The shape of the gasket is such that when the pipe are drawn together it is compressed and not subjected to tensile stresses. This is a distinct advantage in its favor, from the standpoint of life expectancy.

Prestressed Concrete Pipe Not a New Venture

Some of the early experiences in the design and manufacture of prestressed concrete pipe are described in the French Journal, *"Genie Civil,"* May 9, 1931, about this kind of pipe as made in Prague, Czechoslovakia, and here is an approximate translation: "The only means to give good results (water tight pipe) is that of exercising outside the pipe a pressure sufficient to create a permanent compression of the concrete. This compression must be high enough to balance the tension due to the water pressure. . . . To obtain this, I have envisaged in 1923 wrapping a helix outside the pipe, of steel wire under tension. I described the application . . . to Genie Civil, 5th November, 1927. . . . One must not pass the limit of elasticity of the wire—it is therefore often desirable to choose a steel of high limit of elasticity—to make it work at a high value far enough within the limit, and to have the certainty that this limit will not be exceeded."

When Sverre Fjeldstad, a civil engineer from Stockholm, Sweden, was here in June 1948, he told me about the manufacture of prestressed concrete pipe in Sweden, Germany, France, Czechoslovakia, and Switzerland. At his suggestion I wrote the International Siegwartbalken-Gesellschaft, Luzern, Switzerland, and received a reply in a letter dated June 30, 1948. The following is copied from this letter:

"In our report No. 106, January 1937, on page 46 you will find the picture Mr. Fjeldstad told you about, showing a plant for winding high tensile strength steel wire on Vianini pipes. Our latest Swiss patent for this machine is No. 234557, inventor is Favre & Cie. AG. Zurich. The problem to make prestressed reinforcement on concrete pipes is a very old one. We think that Mr. H. Siegwart, a Swiss Engineer, who has established our company in 1903, was the first inventor who used this method in 1910 already. You will find an article concerning the development of prestressed pipes in "Beton und Eisen" XXXVII Jahrgang 1938, Heft lo, published by Prof. Dr. Ing. Kleinlogel, Darmstadt. In this article you will find too, the results our German licensee has got with prestressed Siegwart and Vianini Pipes. On the other hand, Vianini Roma, the original inventor of the Vianini plant has developed in the last 20 years a method for the making of prestressed Vianini pipes. Our Czechoslovakian licensee, the Lanna Akciova Spolecnost, at Prague, has, besides our company, Vianini Roma and Zublin Stuttgart, developed her own system for prestressed Vianini pipes.

"From all these facts you will see, that the principle to make prestressed concrete pipes cannot be protected by patents anymore. The only possibility to get a certain protection is to apply for a patent concerning a machine for the winding of the reinforcement."

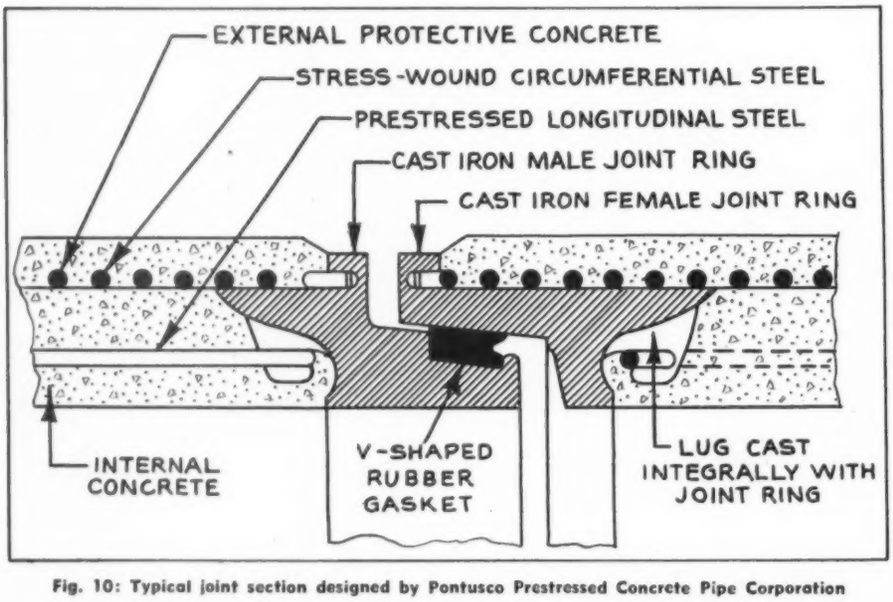


Fig. 10: Typical joint section designed by Pontusco Prestressed Concrete Pipe Corporation

Hydraulic Advantages

The concrete core is in compression at all times and the compressive strength of the concrete is reduced as the internal hydrostatic pressure, and the stress of the circumferential wire, increases. In properly designed pipe, the concrete is never subjected to tensile stresses, including shrinkage cracking. Because the concrete is always in compression, and the steel in tension, the section of the pipe functions as an elastic ring; and in the case of long length pipe, as a flexible beam.

When and if the pipe line is subjected to hydraulic shock (water hammer) so long as the steel is not stressed beyond its yield point, there will be 100 per cent recovery. This

has often been demonstrated by subjecting full-sized pipe to internal pressures beyond those specified in the design. In these tests, or rather demonstrations, the concrete core is subjected to tensile stresses and will crack longitudinally. Water will escape rapidly through these cracks; but when the pressure is reduced to normal, the cracks in the core will be closed by the compressive force of the circumferential wire. The core will then be absolutely water-tight. Even when pipe may be over-stressed in a pipe line, as described above, the cracks in the concrete core will be sealed by autogenous healing; in the presence of water, calcium hydroxide forms in the cracks and is converted to calcium carbonate—limestone—just as strong and impermeable as the concrete. This flexible quality of prestressed concrete pressure pipe is considered a distinct advantage by those experienced in its use.

The greatest pressure to which any prestressed concrete pipe line has been subjected, so far as I know, was disclosed to me at Cotorro, Cuba, by Jean Louis Contenson, general manager, Pontusco Corporation of Cuba. Through M. O. Peirce, chief engineer, Mr. Contenson described and showed me pictures of a penstock built at a power plant on the Selves River in the Province of Garonne, France in 1946. It was constructed with prestressed concrete pipe 63 in. in diameter, shell thickness 5½ in. and in lengths of 6 meters—19.68 ft. The test pressure of this pipe line was 795 p.s.i., without any leakage through the concrete shells of the pipe or at the joints, of the same design as shown in Fig. 10. Before concluding this section, I wish to add that the concrete engineer of the Pontusco Corporation of Cuba is Frederick Schiff-Francois, who together with Mr. Contenson and Mr. Peirce, is responsible for the production of this excellent prestressed concrete pipe. All the rest of the superintendents, foremen and workmen are Cubans trained from scratch to make the best prestressed concrete pipe and specials I ever saw anywhere.

Structural Advantages

On September 1, 1939, I saw a 24 in. diameter, 12 ft. long prestressed concrete pipe tested by the standard, A.S.T.M. 3-edge bearing method to 300,000 lbs., the limit of the testing machine. Because a high percentage of the load was concentrated at the bell end of the pipe, a fine crack developed at this point; just as soon as the load was released, the crack closed and could not be seen. What the ultimate load, required to crush this pipe, would have been can only be determined when pipe of like design and manufacture are tested.

These prestressed concrete pipe were made by the Lewistown Concrete Pipe Co., Hillside, Ill., for a sewage force main at Hammond, Ind. The pipe were designed by J. E. Miller, president of the company. The concrete cores were made by the centrifugal process and were spun in two layers, as at Cotorro, Cuba and for the same reasons. The longitudinal steel members were twelve 5/16 in. rods placed in the center of the 2.5 in. shell of the core and were prestressed to about 70,000 p.s.i. before spinning. After adequate steam curing for about 48 hours—the concrete then had a compressive strength of about 7000 p.s.i.—the concrete cores were stress-wound with oil tempered spring steel wire on a pitch of one inch and at 90,000 p.s.i. The wire used was 6 gauge which has a diameter of 0.1920 in. and a sectional area of 0.028953 sq. in. The one-inch concrete covercoat was placed by the vibrocast method, while the pipe were in a vertical position.

Subsequently, Mr. Miller manufactured some 48 in. diameter and 5 ft. long pipe, for extraordinary loading conditions, at the request of the bridge engineer of one of the railroads. Ordinary reinforced concrete sewer pipe, with a shell thickness of 5 in. and made with concrete having a compressive strength of about 4000 p.s.i., was stress-wound with 6-gauge wire on a pitch of one inch. The sectional area of the circumferential steel was 0.348 sq. in. per foot of pipe; no prestressed longitudinal steel was used.

When tested by the 3-edge method a fine crack developed at 37,000 lbs. per foot of the pipe—again the limit of the hydraulic jack, used to apply the load. Just as soon as the load was released, the crack closed and could not be seen because the concrete was again in compression and the steel wire had not been stressed beyond its yield point.

The A.S.T.M. load requirements for reinforced concrete sewer pipe, with a shell thickness of 5 in. and a steel area of 0.21 sq. in. per foot for 48 in. diameter, are 3400 lbs. per foot at 0.10 in. crack and 5100 lbs. per foot at ultimate load, when tested by the 3-edge method. The record test result of reinforced concrete pipe of 48 in. diameter and a shell thickness of 5 in. with a steel area of 0.55 sq. in. per foot was 13,500 lbs. per foot at 0.01 in. crack and 16,250 lbs. per foot at ultimate load. This pipe was tested by the 3-edge method and is far above the test results of pipe of the same design commercially produced in this country.

Because the concrete is always in compression in prestressed concrete pipe of proper design, when used for high internal water pressure or for extraordinary external loading requirements, it is practicable to design and manufacture this kind of pipe to meet any conditions within reason. And it is desirable that pipe should be made and tested in this country so that standard specifications can be prepared and then the practicing engineers of the United States can see for themselves what a remarkable

Fig. 9: Did you ever see such excellent workmanship, all hand-work, on specials?

product prestressed concrete pipe is—compared with any other kind of pipe manufactured and used today.

The engineers of many other countries are unable to buy steel and cast iron pipe because these metals cannot be obtained and by force of necessity the engineers and the manufacturers had to develop prestressed concrete pipe. By using high tensile strength steel wire, with working stresses of 100,000 p.s.i., and using concrete cores in compression when stress-wound with wire, they have developed this class of pipe. The operations in Cuba and by the Lewistown Concrete Pipe Company certainly are of real interest to practicing engineers of this country today. High prices of steel and cast iron pipe and the shortage of both indicates that we will have to follow the lead of the engineers and manufacturers across the seas.

Life Expectancy of Prestressed Concrete Pipe

Concrete, like steel or cast iron, is as good as you make it and the concrete made and used in the manufacture of prestressed concrete pipe is always in compression. Its advantages in this direction have never been questioned by any responsible and experienced engineer. The 13,000-lb. compressive strength concrete used by the Pontusco Corporation of Cuba, and the concrete of equal quality used by the Lewistown Concrete Pipe Co. and others, is not compressed by the stress-wound wire to more than 2000 p.s.i. When the pipe lines are in normal operation, the compressive stress of the concrete is reduced and it is never subject to tensile stresses. Thus, the life expectancy of 100 years, claimed by the manufacturers, seems to be justified.

UNIVERSAL CONCRETE PIPE CO., Dothan, Ala., plant, is manufacturing concrete right-of-way markers for Alabama and Florida Highway Department use, John Harris, plant manager, announced.

MATT SCHWIETERMAN has placed a ready-mixed concrete plant in operation at Coldwater, Ohio.

Walter F. Tews, president Tews Lime and Cement Co.

INTEGRATED BELT SYSTEM

Handles Six Aggregate Sizes

Large storage capacity for both aggregate and cement mark North Milwaukee plant of Tews Lime & Cement Co., Milwaukee, Wis.

By DAVID MOCINE

IN THIS DAY of rapidly changing demands, the North Milwaukee pre-mixed concrete plant of Tews Lime & Cement Co., Milwaukee, Wis., has been built with an eye to the future. All four types of concrete may be delivered from this plant: transit mixed; pre-mixed concrete delivered in mixer trucks operated as agitators; completely pre-mixed air-entrained concrete in dump bodies; or dry-batched concrete. In addition to this wide choice in manner of delivery, large storage facilities for concrete materials (three types cement, six sizes aggregate) allow a wide variation in mix design.

Aggregate, received in hopper-bottomed railroad cars, is reclaimed from a track hopper by a transfer belt, on 85 ft. centers, with a rated capacity of 250 t.p.h. A flop gate at the discharge end of the transfer belt diverts the flow either to a 200 ft. belt for elevation to the plant, or to a radial, self-powered stacker belt that swings in an arc of 200 deg., with the discharge point of the belt 30-ft. above ground level. Aggregate is reclaimed from stockpiles by a clamshell, which dumps to a hopper feeding the lower end of the plant belt.

At the delivery end of the main plant conveyor, a swing spout diverts material flow to any one of six equal compartments in an overhead aggregate bin of 300-cu. yd. capacity. The entire operation may be controlled from the mixer floor, where a remote control device for the swing spout is located; and where electrical controls are centered for the conveyor belt system. A similar set of controls have been installed at ground level near the track hopper. Electric switches to position as well as start and stop the swing belt are also situated near the track hopper. On the mixer floor are located not only all master switches for the conveyor system; but also for bulk cement handling equipment.

Bulk cement, delivered by rail or truck to a common hopper, is moved to a 75 ft. bucket elevator by a 70 ft. screw conveyor for overhead or storage bins in the usual manner. Three separate weigh batchers proportion aggregate, cement, and water to the mix. Flop gates below the weigh batchers divert the concrete ingredients either to a 112-cu. ft. tilting mixer or to a chute as dry-batched concrete.

Transfer and main plant conveyor belts are of Triangle Enginering Co. manufacture, while the radial stacker belt was fabricated by Barber-Greene Co. A P&H clamshell reclaims stockpiled material. Overhead bins as well as all three weigh batchers are of Butler Bin Co. design. Concrete is pre-mixed in a Smith tilting mixer. A complete cycle of operations at this plant takes about 2½-min., due to the 90- to 120-sec. mixing time necessary for 4-cu. yd. of concrete. Concrete can be dry batched in considerably less time. Ten drum-type agitating delivery trucks operate out of this plant: eight Rex Motomixers, ranging in capacity from 3- to 5-cu. yd.; and two 4-cu. yd. Jaeger mixer bodies; mounted on White, International and Autocar Chassis.

Officers of the corporation are: Walter F. Tews, president; Howard Tews, vice-president; Ernest Willert, secretary; and Lester Prange, treasurer.

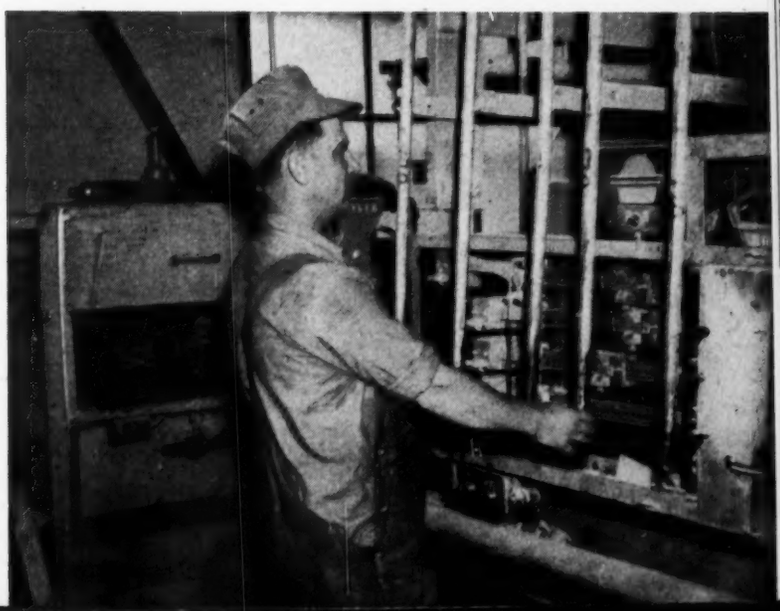
Left: Mixer truck, foreground, under loading chute from 112-cu. ft. tilting mixer. Truck passage, under plant, for charging dry-batched concrete and to right is drum-type truck at gas pump. Over gas pump, in front of railroad car, may be seen cab of bulk cement semi-trailer truck unloading to rail hopper (cement elevator and ground storage tank, behind plant). Swing stacker conveyor may be seen under main plant conveyor; and over car, right, may be seen boom of 1-cu. yd. clamshell used for reclaiming stockpiled aggregates

Above: Looking down 24-in., 200 ft. covered conveyor to transfer point and stockpile area. Transfer belt from track hopper, right, is on 85-ft. centers. Radial stacker belt, left, on 76.5 ft. centers, is self contained, with 10-hp. motor on belt drive and 5-hp. motor on radial drive. Note 15-cu. yd. hopper over transfer point that is charged by clamshell in background. Main belt is powered by 25-hp. motor and transfer belt by 15-hp. motor. All three belts have approximated capacity for 200 t.p.h. at 300 f.p.m.

Right: Bulk cement being discharged to track hopper. Plant uses standard portland, high-early and air-entraining cement, with a total storage capacity of 2,258 bbl.

Lower right: Florian Konkol, batcher operator, at controls of aggregate bin. Note extreme left water weighbatcher (cement batcher is out of picture to right).

Below: Closeup of radial stacker belt that swings in an arc of 200 degrees at a discharge height of 30-ft.



PACKAGED READY-MIXED CONCRETE

Sakrete, Inc:, Cincinnati, Ohio, proportions dry materials for concrete and mortar to merchandise in paper bags weighing 90 lbs. or less

THE IDEA of packaging a dry ready-mixed concrete in dust-tight packages conceived 14 years ago and patented by Arthur C. Avril of Cincinnati, Ohio, has been developing into a surprisingly large and specialized business that is rendering a real service for many small classes of construction and repair where concrete is required. Sakrete Products, as the various mixes have been appropriately trade-marked, are well on the way to national distribution and since 1945, have been available through plants under franchise with Sakrete Inc., to users in 29 states.

To those who know concrete and aggregate and who appreciate the variables that influence quality of concrete and recognize the considerations involved in packaging uniformly proportioned dry ready-mixed concrete and its merchandising, we point out that several years of research and many years of experience in concrete and aggregates led to the development of Sakrete products.

To go back to the beginning, Art Avril, after his graduation from Ohio State University as a mining engineer, became associated with the France Stone Co., of Toledo, Ohio. Exploration and core drilling of stone deposits and the development of new outlets for crushed stone were his principal activities, and in 1927 he undertook a study of the potentialities of ready-mixed concrete. In 1928, he influenced a group of men in Cincinnati to become interested in ready-mixed concrete and organized Avril Tru-Batch Concrete Inc. This was the first ready-mixed concrete plant in Cincinnati and probably the eighth in the nation.

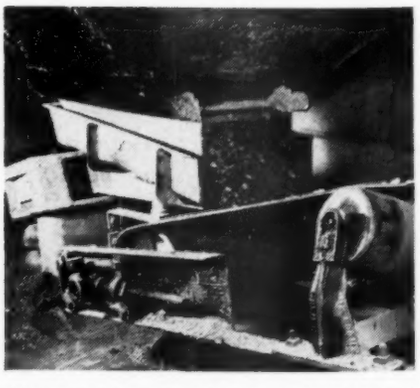
It is of interest that the original plant was built back in 1928 to provide for size separation and recombination on aggregates in order to minimize size segregation. The detrimental effects of segregation were not widely understood and provided for in many specifications until many years later as we all know. To take full advantage of this method of controlled grading to attain maximum uniform strength and workability, it was found that the now antiquated 1-2-4, etc., specifications could not be adhered to, so in 1929 they began marketing all concrete mixes on a strength basis. Architects, engineers, and contractors, soon recognized the value of doing this after observing the extremely uniform strength results and the accuracy with which workability was controlled. Contractors found placing costs reduced and honey-comb negligible. This contribution to the concrete industry was standard practice in the Cincinnati market many years before it was generally recognized nationally.

Art's original ready-mixed concrete plant was a central mix operation and delivery was in open trucks. The limits of open truck delivery were soon recognized so he patented his own agitator for truck delivery of concrete in 1929. When the ready-mixed concrete business was sold in 1936 the capacity of the two central mixing plants had reached 2000 cu. yds per day. Cincinnati's famous railroad terminal was among many large projects poured with central mixed concrete from his plant.

Recognizing that many people had need for smaller quantities of concrete than could be delivered economically by ready-mixed concrete trucks, Mr. Avril started to experiment in 1934 with the idea of providing uniformly proportioned dry mixes in small quantities. As normal segregation of aggregate sizes to the degree common in regular commercial mixes would prevent production of a uniformly strong and workable product for preparation for sale in small packaged quantities, he devised methods of size splitting and recombination to minimize the variations. The ultimate result was the decision to develop equipment and special methods for batching and mixing of materials for each sack of product individually. Much research was conducted before perfection of methods to dry aggregates sufficiently in order to guarantee that the mixed dry product would not deteriorate or harden even when stored in sacks over long periods of time. All surface moisture had to be removed and also 70% to 80% of the absorbed moisture (99.8% total) in the aggregates. Process patents issued in 1939 cover the features of being able to produce dry pre-mixed concrete uniformly and economically through the use of automatic machinery especially developed for the proportioning mixing and bagging of each package individually. Improvement patents are still pending. Actual labor costs for mixing and bagging have been reported by licensees to be as low as 1c per bag.

When the original plant was built in Cincinnati, Sakrete dry ready-mixed concrete, was the first product introduced and the marketing plan was based on the idea that jobs requiring less than ½ cu. yd. of concrete would best be served by the packaged product; that quantities in excess of ½ cu. yd. are in the province of ready-mixed concrete truck delivery. The product was designed for 4000 p.s.i. compressive strength regardless of the top size of aggregate. That figure is the present standard and is a guarantee of a safety factor for the types of jobs on which the product would normally be used. In addition to Sakrete dry ready-mixed concrete, new packaged products were developed as demand for them arose, and all bear the

New plant of Sakrete, Inc., in Cincinnati. In center is screening and processing tower with bulk cement elevator on left and one for aggregates on right. Offices are to the left and storage is to the right



Vibrating feeder regulates flow of mixed sand and gravel for rotary dryer feed at new plant

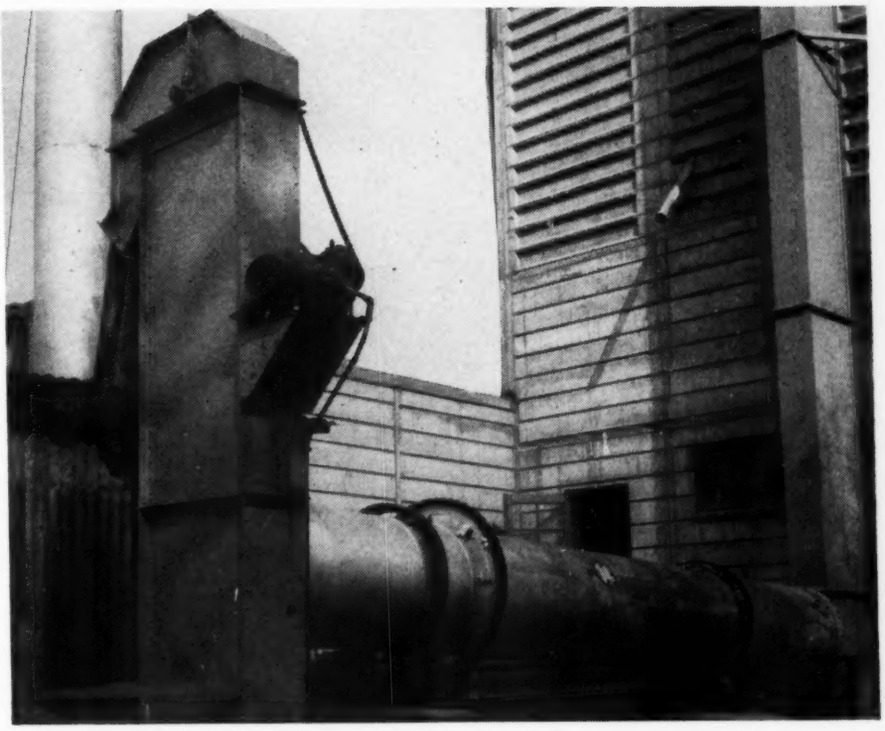
"Sakrete" trademark. They include Sakrete Sand Mix, a dry prepared cement plaster or grout mix; Sakrete Water-Tite, a ready-mixed waterproofed cement grout; Sakrete Mortar Mix, a mason's mortar; Cablekrete, a mix for the protection of lead covered power cable that is fire-resistant and contains a corrosion inhibitor; and Cabelube, an inorganic power cable pulling compound.

Thus have been developed methods whereby concrete and mortar in bags, with simple instructions for the addition of water, placing and mixing, are available for all sorts of small jobs and for use by the inexperienced. The many advantages (see ROCK PRODUCTS, October, 1942, pp. 92-96, November, 1946, pp. 88-89, and June, 1944, pp. 64-65) of these products, have been developed into a substantial business that required the building of a completely new plant of doubled capacity just finished and illustrated herein.

The original plant was a single unit operation that employed two men and produced 1000 sacks of product per day. Basically, the principles of operation are the same in the new plant with many innovations and improvements. Five men including the superintendent process 2000 sacks per 8-hour day. Essentially, the process comprises a rotary dryer to which aggregates are fed automatically; sizing of the dried aggregate, proportioning of the separate sizes of aggregate with standard portland cement by automatic methods; mixing of individual batches to fill each sack; filling of the sack and sewing the sack for a dust-tight package. The operation revolves around a pushbutton control box at the bagging station permitting the operator to control production by simply pressing two buttons. One starts the batching and mixing operations; the other releases the batch into a sack. The many automatic features, including a completely interlocked control system to guarantee weights and proportions are protected by patents.

Unusual Construction In New Plant

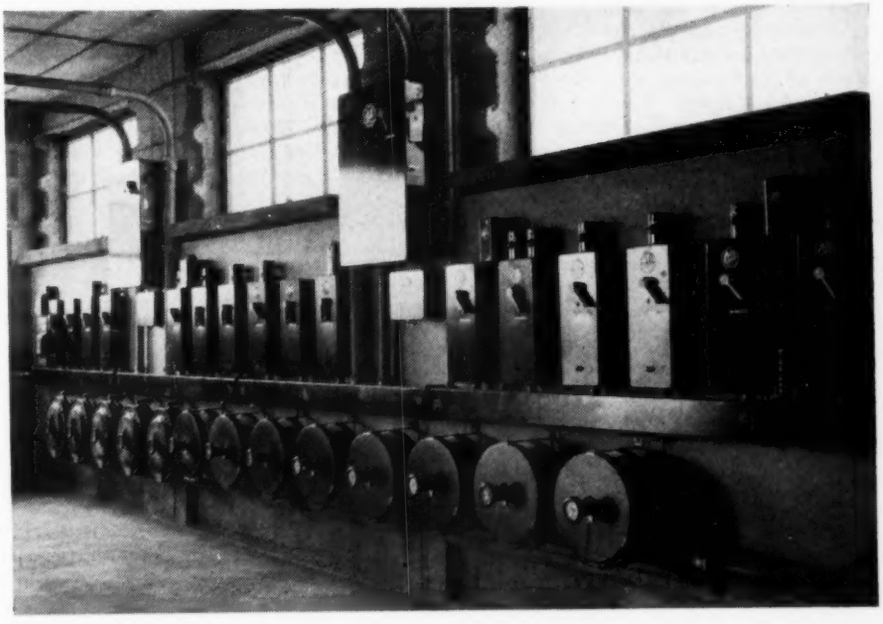
The new plant is a monolithic concrete structure located on a siding of the N & W Railroad to receive sand and gravel and bulk cement by rail. A plant-run mixture of sand and gravel is fed from the track hopper by vibration onto a belt conveyor which charges a bucket elevator for feed into a gas-fired rotary dryer. Dried aggregate is then elevated into overhead bins. Bulk cement is elevated into bulk cement bins by conventional methods from hopper cars. Details of the balance of the process up to the point of bagging in multiwall paper sacks are unavailable. Filled sacks are stacked on wood pallets and handled into storage and loaded for shipment by a Twin-Tilt hand truck. This truck has a tiltable framework which requires very little effort by the operator to pick up and tilt an entire stack of sacks onto the main frame into carrying position and to then set the stack down vertically in storage or on a truck bed. It is a patented development of Mr. Avril and one that is finding wide acceptance in building supply yards and in industry. This product is manufactured by the Twin Tilt Truck Co., of which he is the owner.



Dryer for aggregates. Feed elevator is on left; on right is elevator to screening plant

The new plant is of unique and original construction developed by Mr. Avril which enabled him to complete a modern structure at prewar costs. The walls consist of precast concrete columns with modular spacing which were the form supports for poured in place concrete sections. Roof construction as illustrated herein was poured using the same 12-in. metal forms used for inside wall forming and precast supporting units. Actually the columns and sections were tied so that the structure is truly monolithic. It was built for 7000 sq. ft. of space on the first floor, and has a total of 12000 sq. ft.

With this system of construction no shoring was required and a fireproofed building of 6-in. net wall thickness was completed at a cost, including electric wiring, heating and plumbing, of less than $2.50 per sq. ft. of floor space. Lumber and labor were held to an absolute minimum. The



Illustrating the processing involved in preparing dry ready-mixed concrete is this electric control panel for various automatic operations

Close-up of concrete roof inside new plant. Forming for concrete held by precast concrete units

system lends itself to repetitive operations, and was completed in eight months by common labor and one skilled carpenter. Warehouse space is provided for 12000 bags of Sakrete. The structure was so well thought of by the insurance inspector that the published rate on fire insurance was reduced from 97c per hundred dollars to 6c per hundred.

Merchandising

Prior to 1945 Sakrete was available only in Cincinnati and contiguous areas. From the beginning, it was merchandized through building supply dealers and large hardware stores which were provided with mailing stuffers and advertising signs to draw attention to the availability of the product. General advertising was also used to help create demand.

It soon became apparent that smaller quantities than the original 90-lb. sack of dry mixed concrete were desired. As a result it was made available in 45-lb. sacks, also; Sakrete Sand Mix, in 11-lb., 45-lb. and 80-lb. sacks; Sakrete Mortar Mix and Sakrete Water Tite in 45-lb. and 80-lb. sacks; and Cablekrete in 11-lb. and 80-lb. sacks.

Arthur Avril, president, Sakrete, Inc.

From the beginning merchandising has included advertising in newspapers, reaching principal distribution outlets, advertising literature, dealer promotion, and personal solicitation. The greatest concentration was in building up dealer outlets in order to reach the general public and in personal contact with other groups who were found to be logical users and prospects which would stock the product for ready and regular use over long periods of time. As the product gained acceptance, demands for variations led to the production of White Sakrete and Sakrete White Mortar.

Volume of sales in the Cincinnati area has increased 20% to 30% annually since introduction of the product and there are now more than 150 dealers in the city handling Sakrete products. There are more than 5000 dealers throughout all the territories under license. Output of the new plant with its increased capacity is distributed within a radius of 125 miles of Cincinnati.

In 1945 Sakrete Inc., granted its first franchise to Harry T. Campbell Sons Corp., Towson, Md., which now operates two plants at White Marsh, Md., on the outskirts of Baltimore. Plans for their New York plant are now in preparation. They are licensed to produce and manufacture Sakrete products in ten territories. More recently W. R. Bonsal Co., with a plant in Lilesville, N. C. was licensed to manufacture Sakrete products for distribution in five territories. Other plants are in operation in Chicago, Ill., by Dry-Mix Concrete Co., Inc.,

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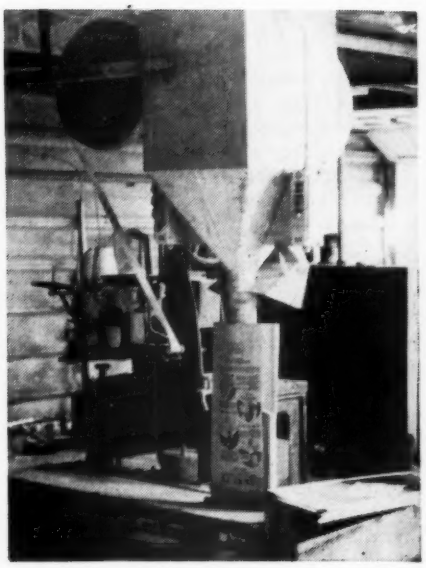
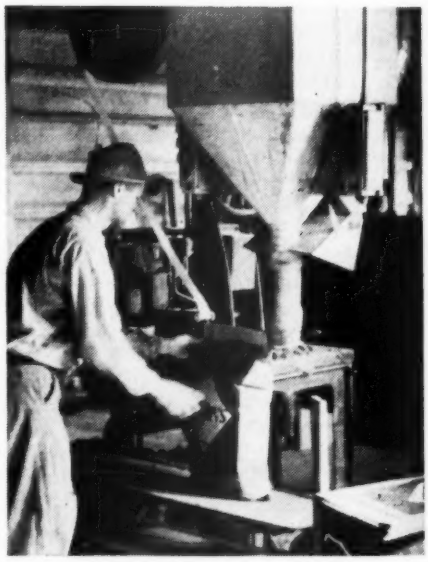
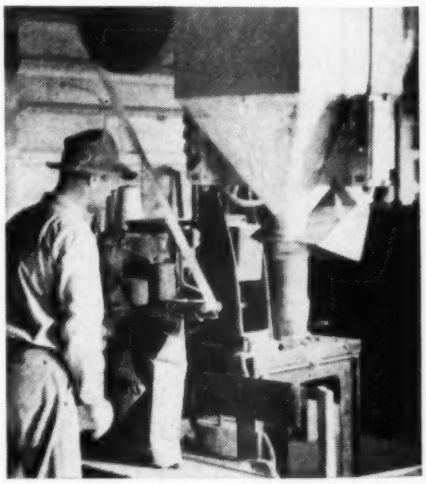


At operator's station is the filling spout on right and sewing machine on left



Sacking dry batched concrete, mixed on floor above. Note push buttons which control entire operation. To operator's left is sewing machine



Sewing a sack closed after filling from spout on right. Note dust collector intake at spout

Overall view of plant showing easy access to railroad siding in the background with highway in foreground

Centralized Control for Material Handling

Carolina Quality Block Co., doubles kiln capacity. Vibrators speed up car unloading

By W. B. LENHART

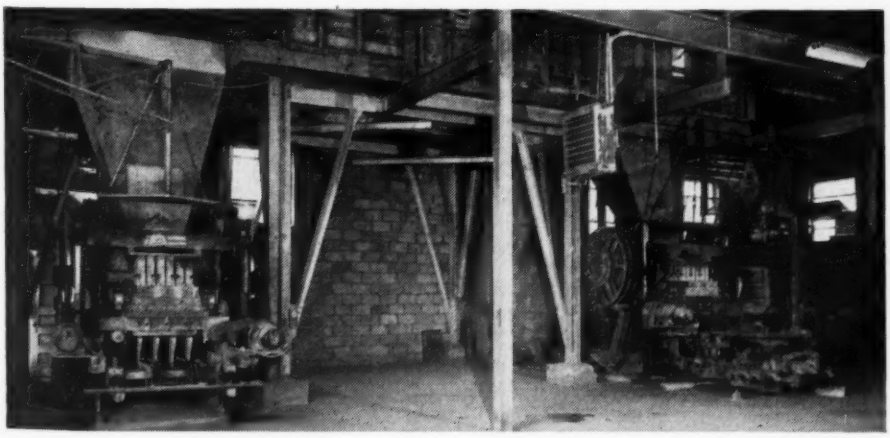
ONE of the heaviest concentrations of population in the Southeastern States is in the areas contiguous to Greensboro, Winston-Salem, and Charlotte, N. C. All the intermediate towns and cities within the triangle formed by these three main industrial hubs support many factories, textile, tobacco processing plants etc. Extensive construction programs for these industries and housing are taking an increasing volume of concrete blocks and precast concrete structural members.

One of the newer block manufacturing companies in Greensboro is the Carolina Quality Block Co., located on Highway 220 in the southern section of the city.

ROBERT M. DINKLE, president of the company, built his plant around the idea that large tonnages of aggregate and bulk cement should be handled without many workers and that storage facilities should be sufficient to tide over any railroad delivery failures. The company has a dual siding which holds 12 cars at one time. An electric car mover is used to put cars in position over a steel receiving hopper for unloading. Materials fall to a horizontal belt which conveys them to a bucket elevator, 85 ft. centers, with distributing spouts through which the four sections of a 600-ton ground storage bin or the four compartments of the batching bin can be fed separately. There is direct feed back from the ground storage bin to the conveyor belt to permit materials being reclaimed for use in the batching bin. All operations are controlled from a central point at the boot of the elevator.

Cement is received from Giant and Lehigh in bulk cars and by means of a screw conveyor and bucket elevator delivered either to a 530 bbl. silo or direct to the day bin. Batching for two 50-cu. ft. Besser mixers is done on a mezzanine floor with C. S. Johnson equipment. By means of scales and levers, material is first weighed and then spouted through long chutes from the bin to the mixers.

Two Besser machines are on the main floor of the plant. One of these is the new type with an automatic pallet feed. Racks of green blocks are moved from the Super Vibrapacs to the curing rooms by means of a Clark 40 Yardlift, equipped with pneumatic tires.



Two of the high production block machines operated by this plant. Note unit heater and fluorescent lighting

Increasing Kiln Capacity

The original five curing rooms, 34-ft. long, have been doubled to approximately 70-ft. by Leo F. Sauerbier, plant superintendent. This construction was done with plant workers. Telescopic steel joists furnished by the Besser Company were used along with soffit tile blocks and ready-mixed concrete to make the 8-in. thick roof.

The curing cycle involves a setting period of several hours, followed by six hours of live steam at 160-deg. F., and a soaking period of eight hours. A Cyclotherm oil-fired unit of 65-hp. is used to furnish steam and heat to the kilns. This unit, automatically controlled, is mounted above the locker room inside of the plant. This location saves floor space and protects the boiler from being damaged or tampered with readily.

Vibrators Speed Car Unloading

The plant operates very efficiently from the unloading of aggregate to the loading of finished products on trucks. Through the use of Syntron electric vibrators, the idea of which Mr. Sauerbier got through reading an issue of ROCK PRODUCTS, it is possible for one man to unload a 60-ton car of aggregate in less than one hour. During seasonal peaks from 22 to 26 cars are unloaded every week.

Twelve men are employed to operate the plant throughout from the unloading of cars of aggregate to the delivery of cubes of cured blocks on trucks of contract haulers. The present schedule calls for five days of 10 hours each devoted to production, and a sixth day of four or five hours given over entirely to plant maintenance. Labor costs per 8-in. equivalent unit come to $0.023, a figure which speaks well for the efficiency of the plant.

For aggregate, the company uses No. 68 and No. 8 slag from the Birmingham Slag Company and screenings from the North Carolina Granite Corporation. This mixture of these materials gives an excellent texture and results in an 8- x 8- x 16-in. block of 38-lbs. All units are marketed under the trade name of "CAROLITE."

Cured blocks that are 10 days of age show a compressive strength of 1200 to 1600 p.s.i. Representatives of the Underwriters Laboratories make monthly inspections and tests of the products. In order to determine more exactly the different mixes, the company plans to install a standard testing machine of its own.

The yard and plant make a very neat and striking operation. Concrete runways in the yard are paved in "U" shaped segments with additional ramps from the extended kilns. The cured units are moved from the yard end of the kilns by concrete runways leading to the cubing stations. After being cubed the blocks are placed in inventory by an Erickson fork lift truck. This machine is also used to load the trucks of haulers. These trucks operate satisfactorily on the unpaved areas since they have been hard surfaced with spill-over from the machines.

L. Sauerbier, superintendent

Plant is designed for gravity flow of cement and aggregates

The main structure of the plant and kilns is of block and steel construction. It was built in accordance with specifications furnished by the Besser Company for two-machine plants.

This progressive concern is seeking constantly new items that will sell in its market. Mr. Sauerbier will soon make an extensive trip throughout the eastern part of the United States, visiting modern plants to get new ideas on how to improve the quality and efficiency of production. Some interest was expressed in the manufacture of colored units, pre-cast lintels, complete door step units and in the use of straddle trucks when delivering blocks and bricks.

Saving Cement

(Continued from page 121)

most of the aggregate was minus ¾-in. Some portions of the building when poured were not even vibrated, yet an excellent concrete resulted with no rock pockets. The job involved 1640 cu. yd. of ready mixed concrete and the strengths obtained were above the figures at the first mentioned job as the intent was to have concrete that would stand up under the heavy vibrations of the newspaper presses. William Loehr was superintendent for the contractor.

A description of the new plant of Triangle Certified Concrete, Inc., was published in ROCK PRODUCTS, December, 1945, p. 88, and since then no great changes have been made in the general features of the plant. Batchers were supplied by Conveyor Co., and a fleet of 15 Rex high dump, 4½-cu. yd. (rated capacity) mixers mounted on Diamond "T" trucks, are operated.

In the plant the long belt conveyor from the truck hopper has had a wind-guard put in place that is rather novel and simple. Here the wind blows from the north and was of such velocity that even the loaded belts would not ride the rollers properly, so they called up Walter Saxe of the Conveyor Co., and he suggested the arrangement shown in the illustrations. The slats are 1 by 4's about 4-ft. long bolted to angle iron cross pieces in about 40-ft. sections. The sections are then bolted to the conveyor runways. It has been in place about a year and has corrected the trouble.

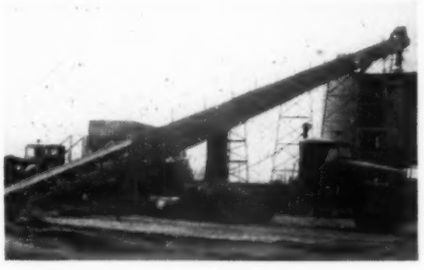
Mixer Truck Washing Practice

Trucks are washed by simply hosing them off at a depression near the plant where the wash waters are syphoned to two settling basins, and the second basin syphoned to the city sewer system. The pockets are cleaned out periodically.

On the rear-wheel assemblies of the trucks, the clamps holding the spring leaves in place have been spread 2-in. This amounts to taking out about 9-in. of spring, and was done to strengthen the rear springs. All the trucks are being changed over in this manner.

The Triangle Certified Concrete, Inc., which also operates a plant at Fontana, Calif., completed a job in connection with the Coachella branch of the All-American canal in the Imperial Valley district of Southern California. Seven of the mixer trucks were assigned to this job which used a Kenweld batcher.

Officers of the company are: George Thwing, Jr., president; B. V. Steel, superintendent; Paul Christenson, mechanical superintendent; Harvey E. Olds, office manager; and E. H. Hostetler, dispatcher.



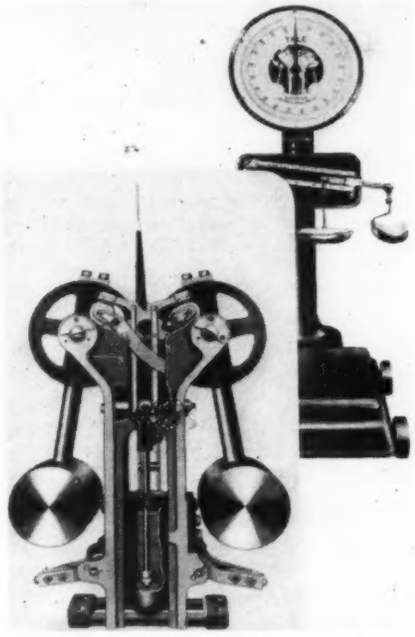
Yard of Triangle Certified Concrete, Inc., showing wind guard on side of main plant conveyor from track hopper. Guard is made of 1- x 4-in. pieces of wood spaced 6-in.

Washing down 4½-cu. yd. transit mix truck at lip of sump

NEW MACHINERY

Dial Scale Mechanism

THE YALE & TOWNE MFG. CO., Philadelphia division, has introduced the Magnetrol, an improved dial scale



Platform scale mechanism can be locked to prevent any possible damage from shock loads

mechanism. It is claimed that this mechanism achieves: (1) a straight line relationship between the platform load and pointer movement without specially filed cams, adaptations to prevent backlash or delicate adjustments of the angular relationships between sectors; (2) a reduction of service adjustments from six or seven to two; and (3) full but light engagement between the pointer rack and pinion by means of a permanent magnet. All moving parts are mounted at three fixed centers in a single gray iron casting, and they move on ball bearing surfaces to minimize internal friction.

Capacity of mechanism under direct loading without any lever system is 25 lbs.; its application to industrial loads up to 50 tons is a matter of lever linkage. Its guaranteed accuracy is one part in 1000, but it is claimed that accuracies of one part in 2000 are obtainable. The dial head, which contains a 20-in. diameter reading line dial chart, can be swiveled through 360 deg.

Heavy-Duty Lift Truck

GERLINGER CARRIER CO., Dallas, Ore., is now in production of a lift truck that is a companion to the company's material carrier. The new lift truck is manufactured in four different models: 4-, 5-, 6- and 8-ton capacities. Loads can be lifted to heights of 14-ft. 2-in. with standard boom or higher with special boom extensions. Features of this lift truck stressed by the manufacturer are: a design that places 54 percent of the truck weight over the front or drive wheels when the truck is not loaded; a rear end assembly engineered so the deadweight of the load is absorbed by a stationary load axle, not the differential housing.

According to the maker, other features are a floating-type boom action that allows added flexibility and maneuverability; a trunion full axle pivot of the steering wheels; large capacity hydraulic brakes and one-lever control of hoisting and tilting mechanism. A heavy duty Ford truck motor allows four speeds both forward and reverse.

Lightweight Lift Truck

TRANSITIER TRUCK CO., Portland, Ore., is now in large scale production of its new Transitier, available in two models: 1000 and 2000 lb. lift capacity. Powered by a four cylinder Cobra engine that develops 26 hp., the three wheel lift-truck has a 61-in. turning radius. Outstanding feature, according to the manufacturer, is the Hydroflex clutch that is mounted behind and above the engine for ease

Lift truck in 2000 lb. capacity class

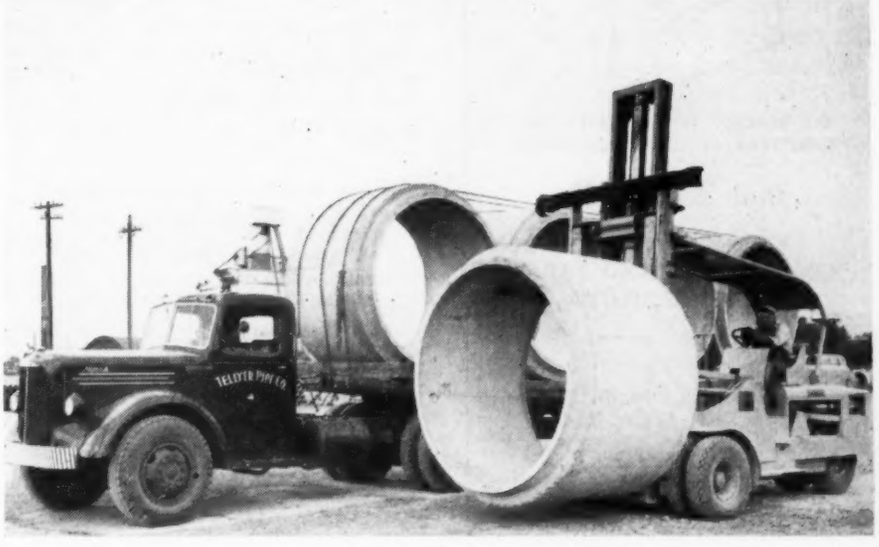
of access, and which can be adjusted or completely changed in 15 min. This clutch is operated hydraulically. Both models available in 5-, 7-, 9-ft. lifts.

Air-Entrainment Meter

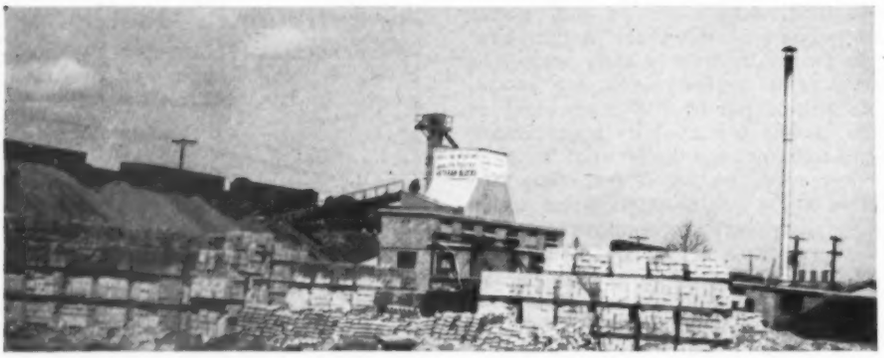
CONCRETE SPECIALTIES DIVISION, Spokane Stove Repair Co., Spokane, Wash., is now offering the Roll-A-

Air-entrainment meter that washes air out of concrete sample

Meter, a device for determining the amount of air entrained in concrete. The meter uses the rolling method that washes the air out of the concrete and is said to be rapid, easy and accurate. The all-bronze meter tests a small sample of concrete made with either natural or lightweight aggregate, and without regard to porosity.



Lift truck particularly adapted to heavy loads



Overall view of the plant showing railroad trackage in background with conveyor inclining up to hopper of bucket conveyor for moving cement from hopper cars to bins

Sell crushed cull block as driveway paving stone at Winston-Salem, N. C. plant, Veterans Building Block Co.

By W. B. LENHART

Radio-Newspaper-Direct Mail ADVERTISING Pays Off

WHEN a group of World War II veterans stake their entire resources on a new venture, "hocking their shirts" so to speak, and then in the space of two short years build up their business to one of the largest and most successful in western North Carolina there must be a reason, or several reasons behind that success.

During the later phases of the war, PAUL L. BARNES, who is now the president of the company, was stationed in Washington, D. C. He was anxious to get himself, like most veterans, established in some business after the war was over. While visiting his relatives in western North Carolina he chanced to see some concrete block being put to use. "Up to that time," said Mr. Barnes, "I hardly knew that such a thing existed." On his return to Washington he went into a study of the possibilities.

We are always interested to know exactly how the newcomer gets into the block business so we pressed Mr. Barnes further. He said that he visited plants in and around Washington, D. C., and found that the producers were all very helpful, showed him around their plants, and one even gave him cost figures. These same producers described machines and pointed out their relative advantages.

By studying the matter further, he decided it was the business for him so he got four other veterans to join him and the venture was born. On visits to Winston-Salem he made calls on builders, friends, and bankers and with what funds they had, ordered their Besser Super Vibrapac even before they were out of uniform. Making block with a modern plant is one thing but selling them in a clay brick district, and at prices that might be considered very high in some sections because of the long haul for cement, slag aggregates, etc., was another thing.

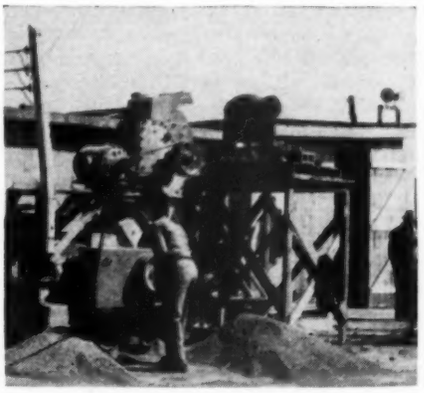
SLAG-CRETE
BUILDING BLOCKS
SIZES
4" x 8" x 16" - 6" x 8" x 16"
8" x 8" x 16" - 12" x 8" x 16"
ALL BLOCKS 100% VIBRATED AND HIGH TEMPERATURE STEAM CURED
Dial 3-1508
WE SPECIALIZE IN HIGH GRADE
COMMERCIAL AND FARM BUILDING UNITS
Veteran BUILDING BLOCK Company
NORTH LIBERTY STREET EXTENSION
"Opposite Smith Reynolds Airport"

One of the typical newspaper advertisements

Use Radio and Newspaper Advertising

No outside salesmen are employed to sell block, but they are keeping the plant running at full capacity. All the sales are handled at the plant office and by the operating personnel. Three radio programs are one of the main forms of advertising. As farmer trade is a big item, one radio program starts with a weather report over WSJS at 6:00 a.m. This 5000-watt station is the largest radio broadcasting station in the district. At noon 30 minutes of farm news is broadcast on four days over WSJS, called the Piedmont Farm Program. On Sunday about noon, Station WSJS (NBC) ties the local station into the news "World Roundup" by John McVane. This is a 15-min. newscast. The cost of these three radio hook-ups is about $400 per month. During the year, the company co-sponsored the broadcasting of all local ball games over WAIR-FM, a local station at a cost of $660 for the season. The radio program is producing business, they believe, and it is now in its second year.

Newspaper advertising also is relied upon to a great extent. At Winston-Salem the morning and evening papers are both published by the same owner but under different names. Advertisements are carried in the Sunday and Monday morning papers. These ads range in size up to 3-col. wide and 8- to 12-in. long, some running in the remaining daily papers, but as a rule they are small. Six weekly papers in the area are used. Newspaper advertising costs about $600 per month. Plant write-ups for the local papers are encouraged, and in such editions, tie-in ads accompany the write-up. There are no secrets



Crushing cull block for the production of a driveway aggregate. This crusher has now been moved over hopper feeding bucket elevator to plant bins

Truck is dumping aggregates to grizzly, and at the right the cut in the bank is the point where aggregates are chuted to same grizzly from track above. Cement conveyor may be seen to the right, above

here. If anything new develops at the plant, new products, new personnel, etc., they see that the papers get the news and thus keep their name always before the buyers. A new product means possibly a newspaper advertising splurge for a week or so. To make up the larger advertisements the mat service of the Besser Manufacturing Co. is used to a large extent. The national pictorial magazine "Pic" recently ran an illustrated story on this operation. Some direct mail advertising is also sent out. A return postal card sent to the farmers in the area, offers to send information on various types of concrete masonry construction. These have resulted in a 12 percent reply on cards sent out. When a reply comes in, literature of the Portland Cement Association or of the Besser Mfg. Co. is sent out as a follow-up. Contractors get direct mail literature. A record is kept in the office of the type of farms in the area, whether tobacco growers, dairy, hog farmers, cattle, etc., and in this manner the direct mail advertising can be directed to the farmer's needs. Two advertisements are carried in the local telephone book; one advertisement on the classified section under "Concrete Products" and another in the "Building Materials" classification.

Local fairs get their share of attention with an exhibit by the Veteran Building Block Co. In Winston-Salem in April of this year, the local manufacturers association had an exhibition in which the block company participated.

As seen from the main highway which parallels the plant, the buildings and storage yard present a striking appearance. It is located along the tracks of the Norfolk & Western railroad, and the spur to the plant is on an elevated dirt fill of such height that an elevator is not required to get the bulk cement into the plant; only a slightly inclined screw conveyor is used. Aggregates can be delivered to the plant by rail or trucks, and all these materials flow to a truck grizzly serving a bucket elevator extending above a four-compartment Butler bin. One man does all the unloading. Syntron electric vibrators are installed at points where aggregates might arch. The Besser SuperVibrapac uses a 50-cu. ft. mixer and skip. Bin filling control is by means of a hand wheel behind the block machine. A medium weight slag from the Birmingham, Ala., area is the favored aggregate for making a 39-lb. block in the 8-x 8- x 16-in. size.

Curing Facilities

Six curing kilns, open at one end, each hold 1700 block and are 13- x 45-ft. Vertical welded steel doors, of two thicknesses of metal with an air space between, weigh about 1300 lbs. each. They are raised and lowered with the aid of suitable counterweights. Three Clark fork lift trucks handle the racks. In each kiln are six coils of 2-in. pipe on each side. Live steam enters near bottom of kilns from 1¼-in. pipe lines. Steel rails (75-lb.) are mounted in the kilns, about 18-in. from the floor, to protect kiln walls. The curing cycle is about as follows: a one to two hour setting period; then live steam for three hours or more to get the temperature up to 165- to 175-deg. F., after which radiant heat is on for 10 hours. Steam is supplied by a 60-hp. stoker fed boiler.

Crush Cull Block for Driveway Aggregate

A new Holland crushing unit has been placed in service for solving the rejected block problem. Formerly, this mill reduced the waste blocks to about minus ¼-in. and the product was all sold for drive-way and similar purposes. This broken block aggregate had excellent bonding properties and sold at a premium price. Crushing this product also keeps the plant looking neater. However, the mill has now been moved to a position over the pit elevator leading to the bucket elevator serving the aggregate bins and the product is now elevated to a bin compartment for reuse as an aggregate.

A Davis Westholt Mfg. Co. shovel loader mounted on a Fordson tractor is employed for handling materials. Recently a Hough Payloader has been added to move material from yard stockpiles to track hopper. Hauling of blocks is all contract work.

One product that is finding a ready market in the area is concrete steps. These "L" shaped units are made in a separate building. The lengths are 3-, 4-, 5- and 6-ft. One leg of the "L" is the tread, and the other the riser. A ½-in. reinforcing rod is in the back or riser with 10-gauge wire in the tread. These are steam cured in small separate kilns. A set of stairs made of these units near the office is used for demonstration purposes. At a repair shop wide enough to admit company trucks, racks and other equipment are repaired, painted, etc.

W. C. CHAMBERS, one of the stockholders and a director, is superintendent. The plant is on North Liberty Extension near the Reynolds Airport.

Equip Lift Truck with Twin Hydraulic Hoists

ERICKSON SPECIAL EQUIPMENT MANUFACTURING CO., Minneapolis, Minn., announces its model F-16, a 16,000 lb. capacity fork lift truck with boom attachment. This heavy duty model is powered with a six cylinder International Harvester gasoline engine

Heavy duty lift truck powered by six cylinder gasoline engine

and four speed transmission. Steering of the three wheel truck is accomplished with a hydraulic booster, operating on a trunion principle, with outside turning radius of 12½-ft.

Twin hydraulic hoists operate the boom and fork lift, with a lifting capacity of 4000 and 16,000 lbs. respectively. Boom lift is 18-ft. and fork lift is 15.5-ft. This model can be custom built to suit individual requirements of the operator.

Arc Welding Machines

METAL & THERMIT CORP., New York, N. Y., has added a new line of AC and DC arc welding machines to its other electrical welding equipment.

(Continued on page 136)

One-dial simplified control panel of new DC arc welding machine

Features claimed for the AC unit include built-in power factor corrector; fingertip, stepless current control; fan-forced ventilation; wide current range; and moderate open-circuit voltage operation. These units are of the transformer type and are available in 150, 200, 300, 400 and 500 amp capacities.

Major design features of the DC models, according to the manufacturer, is a one dial simplified control panel; which carries a series of well-marked outlets for electrodes of different diameters. Motor-driven DC units are available in 150, 200, 300 and 400 amp capacities in new compact 3600 r.p.m. model, as well as the conventional 1750 r.p.m. type.

Electrical Gear Selection

EATON MANUFACTURING CO., Cleveland, Ohio, will shortly announce an automatic electrical gear shift that permits the driver to change from low to high axle ratio and back again "by a mere flick of his finger," according to G. W. Veale, vice-president, axle division. The new shift mechanism will require no declutching or releasing the accelerator, and is said to assure more positive action with less possibility of failure, and also to be easier to service and to install than former models.

A second semi-automatic control will also be announced shortly that is similar to the present vacuum types, but that will be operated electrically. At first the new controls will be available only for the company's line of heavy duty axles built for trucks of 3-ton capacity or more.

Electric-Powered Truck

BAKER INDUSTRIAL TRUCK DIVISION, Baker-Rauling Co., Cleveland, Ohio, has designed an electric powered fork truck in the 2000 lb. class, which is known as type FRH-20 center-control fork truck. This unit has been designed to meet the need for a lightweight, low-priced fork truck. The new truck has a 42-in. wheelbase, is 30-in. wide and has an overall length, exclusive of forks, of 63-in., and weighs 3,850 lbs. A travel controller provides three speeds both forward and reverse, and through an interlocking device, the truck may be started only in first speed. Standard battery equipment is rated at 36 volts and 250 ampere-hours, which capacity is sufficient for 10 or 11 hours service under average operating conditions.

Limestone Conglomerate as Basis for Portland Cement

SOUTHWESTERN PORTLAND CEMENT Co., Los Angeles, Calif., has recently acquired a large deposit of gray to black limestone cobbles in a grayish-white lime matrix near its reserve quarry east of Sidewinder Well, San Bernardino County, Calif. This will be the first time that this type of raw material has been used in milling portland cement in California. Chemical analysis have been tabulated on the material, with the following average result:

	Percent
SiO_2	8.92
Al_2O_3	1.16
Fe_2O_3	0.58
CaO	48.03
MgO	2.29
Ig. Loss	38.84

Basic dikes which damage other limestone bodies in the area for cement use are largely absent in this formation. The only foreign material present in any quantity is chert in the form of brown chert pebbles which are found in a low percentage throughout the deposit. It is planned to build a spur track about five miles from the Quartzite Mountain line towards the deposit, with the balance of the haul being made by 60-ton side-dump diesel-powered trucks.

Ready-Mixed Mortar Plant for Canada

LIME-SAND COMPANY of England is constructing a new plant in Toronto, Ont., for the production of ready-mixed mortar. Initial production will be approximately 300 tons per day, and will be increased to 1000 tons within a short time.

UNIT...tops them all!

For sheer ruggedness, speed and all-around dependability, you just can't beat a UNIT Excavator. UNIT is nimble, sturdy, fast . . . Famous UNIT one-piece cast case provides perfect alignment of all working parts. Other exclusive UNIT features include: Automatic traction brakes . . . Straight line engine mounting . . . Drop forged alloy steel gears . . . Splined shafts . . . Disc type clutches. Convertible.

½ and ¾ YD. EXCAVATORS
CRANES UP TO 15 TONS

New FULL VISION Cab provides maximum visibility. Operator can see in ALL directions. Promotes safety. Increases efficiency.

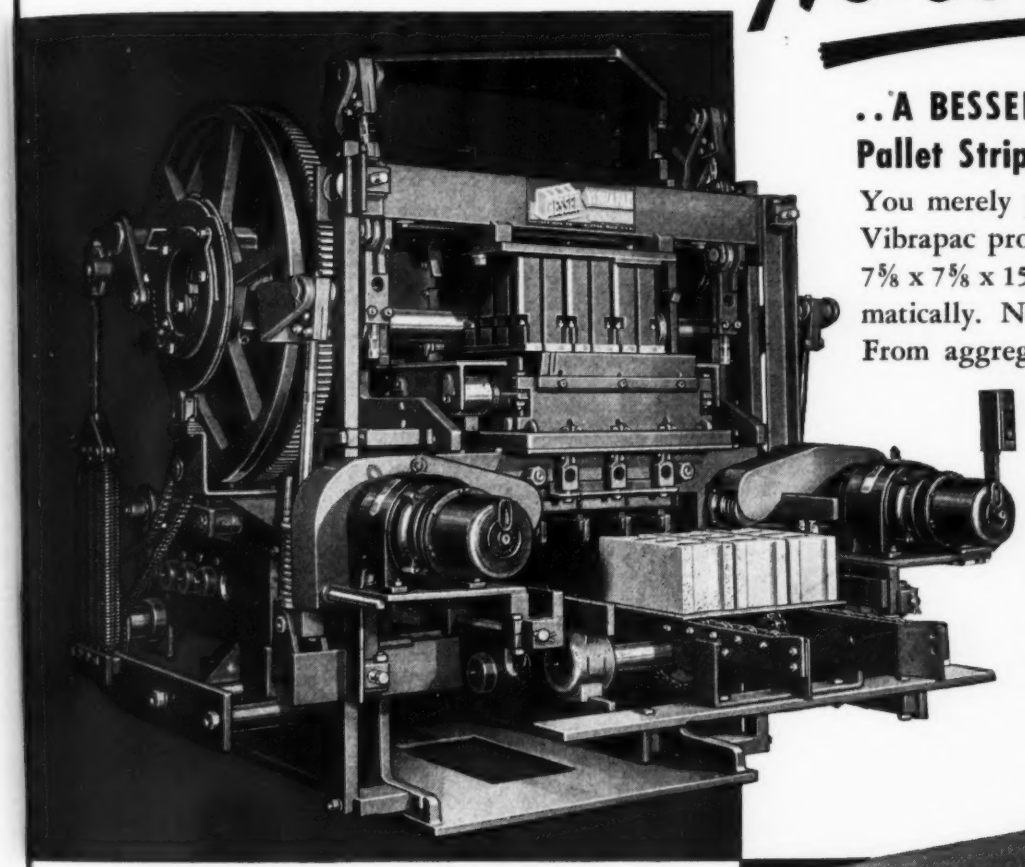
CONTACT FACTORY DIRECT
For Price and Delivery
or See Your Dealer!

UNIT CRANE & SHOVEL CORP.
6431 W. BURNHAM ST., MILWAUKEE 14, WIS., U. S. A.

NEWS ITEM!

The push-button airplane has arrived. Recently an airliner flew across the Atlantic and back "no hands." Actually, an automatic pilot was in complete control and no member of the crew touched or guided the aircraft from take-off to landing. This marvelous invention marks a new era in

THE MACHINE THAT REQUIRES *NO OPERATOR!*

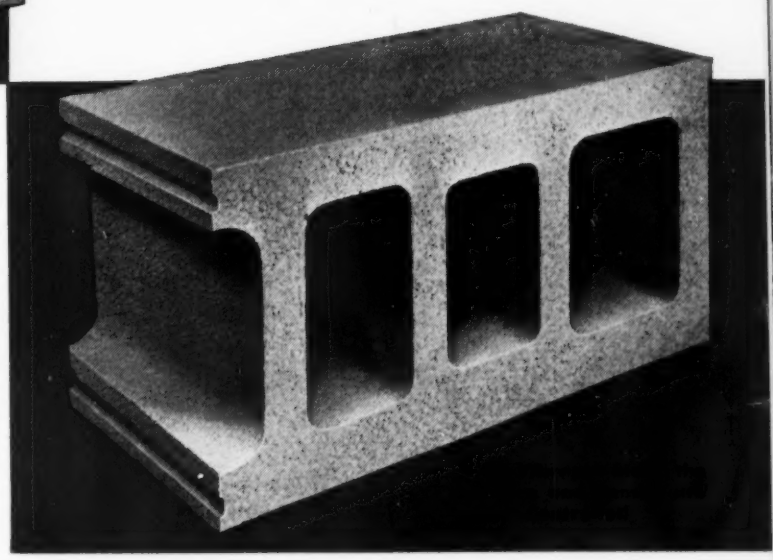


..A BESSER SUPER VIBRAPAC Plain Pallet Stripper is FULLY AUTOMATIC

You merely push the button and the Super Vibrapac produces high quality block, three 7⅝ x 7⅝ x 15⅝ modular units at a time, automatically. No machine operator is required. From aggregate charging to the completed green block, it's a fast, continuous operation, fully automatic, including pallet feeding. The Besser Super Vibrapac sets the pace for modern automatic production and handling devices, assuring maximum block production at lowest possible cost. Get the facts today. Write for literature.

Check these Outstanding SUPER VIBRAPAC Features:

100% Automatic operation . . . One set of Plain Pallets for all Sizes of Block, Brick or Tile . . . Roller Bearing Equipped . . . Instantaneous Mold Release . . . Built Entirely of Steel, Electrically Welded . . . Undirectional Vibration from Two 5 H.P. Motors . . . Vibration under 1000 lb. Pressure . . . One Man Off-bearing with Power Hoist.

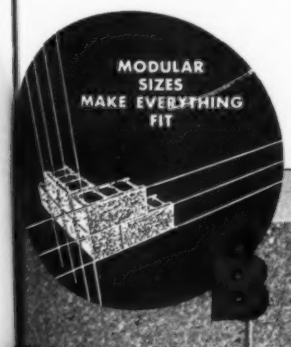


BESSER MANUFACTURING COMPANY

Complete Equipment for Concrete Products Plants

115 48th STREET ALPENA, MICH.

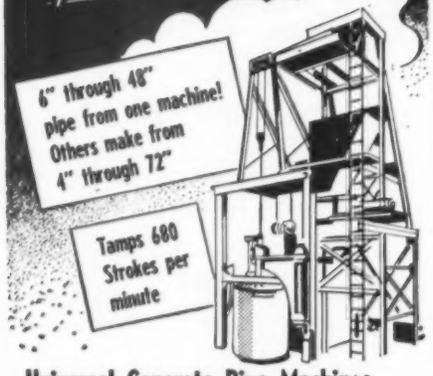
U.S.A.



BESSER *Super* VIBRAPAC

Universal

Pipe-Making Machines are real profit makers because they're built by pipe-makers! ... They produce more pipe in fewer man-hours ... at greater profit!



Universal Concrete Pipe Machines

Real money-makers because they make finest ASTM Specification pipe at lowest cost of operation and maintenance. Designed and built by experts with a quarter century pipe making experience. Write for full details.

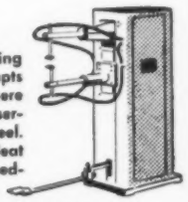
Universal Concrete Mixers

Work horses for manufacturers of concrete products. Simple, dependable over years of continuous operation. Save on first cost and upkeep. Capacities: 28, 42 and 50 cu. ft. Send for information.

Wire Bending Rolls

Bends reinforcing wire and steel plate to any radius, accurately, quickly. Quick, easy removal of completed cages. Extra heavy frame and oversize bearings, with covered gears and overload safety feature.

Wire Mesh Welder



Specially designed for welding reinforcing wire (but adapts for many other uses). Best there is for steady heavy-duty service. Fully enclosed in steel. Water-cooled electrodes. Heat control switch. Swivel foot pedal leaves both hands free.

"It's better to own Universal Equipment... ...than to compete against it!"

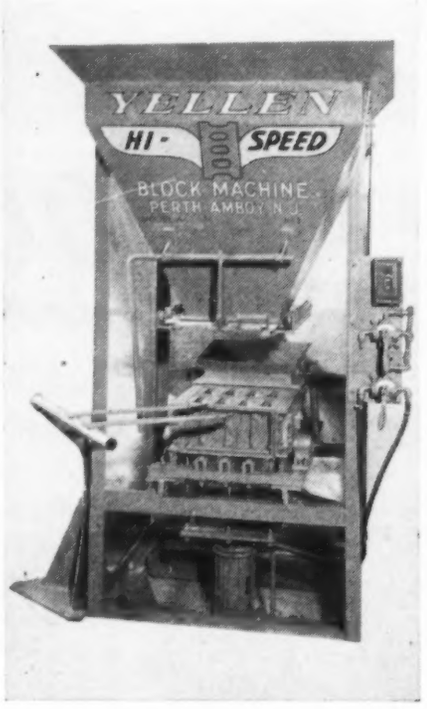
Write Today for details, prices

UNIVERSAL CONCRETE MACHINERY CO.

297 South High Street Columbus, Ohio

Compact Block Machine

JOHN J. YELLEN, Perth Amboy, N. J. has designed and is now manufacturing a block machine capable of capacities up to 400 modular 8-in. block per hour. An electric vibrator is used for compacting block, with stripping and other machine action powered by compressed air. A 5 hp. compressor is required for the Yellen Hi-Speed block machine.



A compact block machine using compressed air for stripping

This machine makes any combination of block that can be fitted in a 16-in. square, such as two 8-in. block; one 4-in. and one 12-in. block; etc. The newest machine is equipped with a vibrating head to finish the top of the block. These attachments are available for earlier models. Replaceable liners for the core box and plates for other wearing points are kept in stock by the manufacturer.

Concrete Products Group Meet in Washington

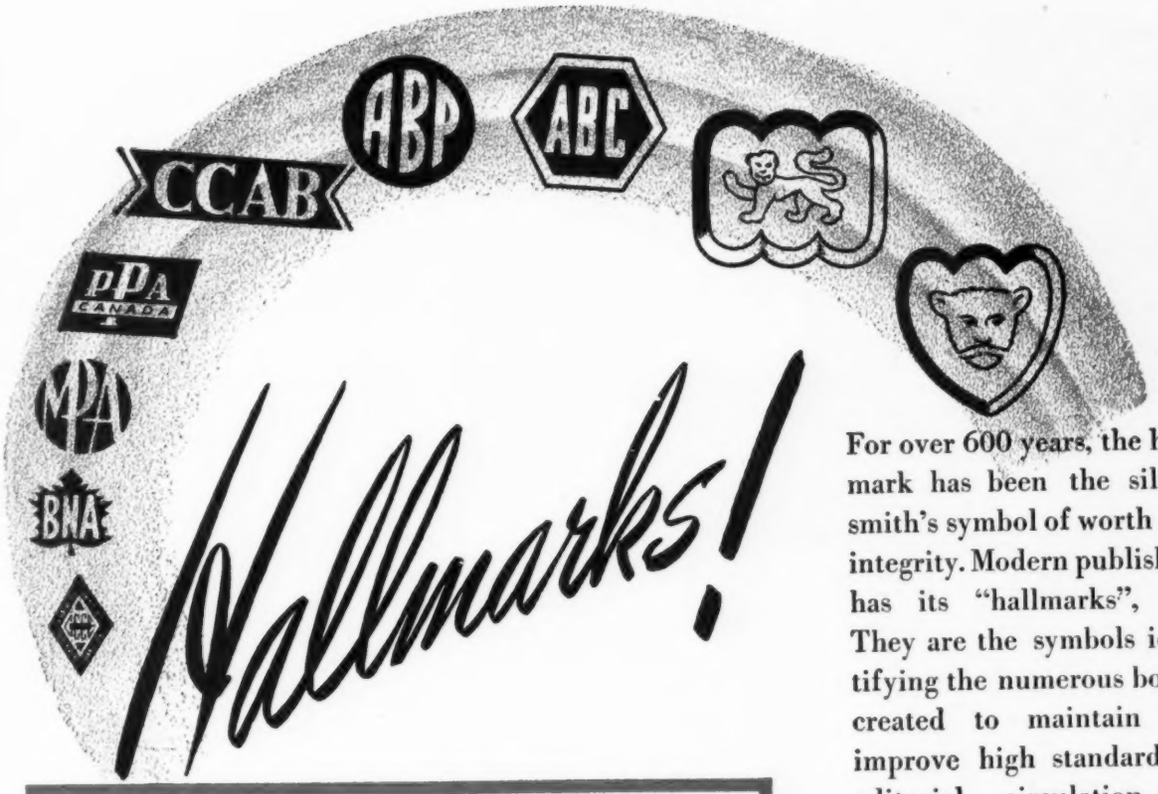
THE ENGINEERS' CLUB, Arctic Building, Seattle, Wash., was the scene recently, of a dinner meeting, held by the Concrete Products Association of Washington, honoring George W. Katterjohn, president, and R. E. Copeland, director of engineering, of the National Concrete Masonry Association. Manufacturers and others interested in concrete masonry from the State of Washington were present.

FRED KETTENRING, Graystone Concrete Products Co., chairman, opened the meeting with an introduction of the guests, after which Ben Saunders from the Seattle office of the Portland Cement Association gave a talk on "New Techniques in Concrete," explaining the experiences of a two-week course on concrete and concrete products held in Chicago.

C. M. HOWARD, engineer for the Concrete Products Association of Washington, discussed "Concrete Masonry Studies Now Underway in Washington," stressing the importance of controlling moisture content of concrete blocks. Research and objectives of the "Pumice Research Program at State College of Washington" were outlined by J. J. Wegner of the Division of Industrial Research at the College.

"Cooperation in Development of Concrete Masonry Industry" was covered by George Katterjohn. R. E. Copeland described the research, education and improved techniques that the National association is offering to its members, in a talk entitled, "Manufacturing Practices that Pay Off for the Plant Operator." The meeting came to a close with a question and answer period presided over by Mr. Katterjohn and Mr. Copeland.

Just to prove they are fishermen. Left to right: Geo. P. Duecy, president, Concrete Products Association of Washington; Geo. W. Katterjohn, president of National Concrete Masonry Association; R. E. Copeland, research director, N.C.M.A., and A. B. Metcalf, vice-president, Concrete Products Association of Washington



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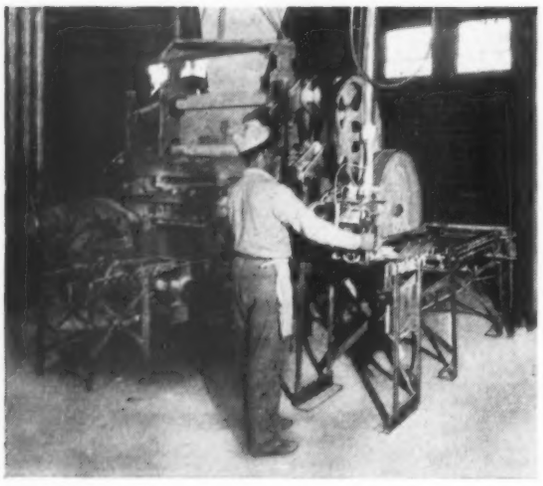

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Modernize your present 18" x 26" plain pallet magazine fed block machine.

Make it a truly one man operated machine by attaching a

DOMINE AUTOMATIC PALLET FEEDER*

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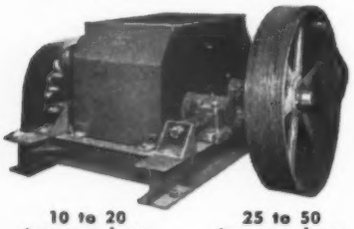

10 to 20 ton per hour capacity **$474**

25 to 50 ton per hour capacity **$1074**

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For almost any type of screening operation, wet or dry. Makes your product more uniform and of higher quality.

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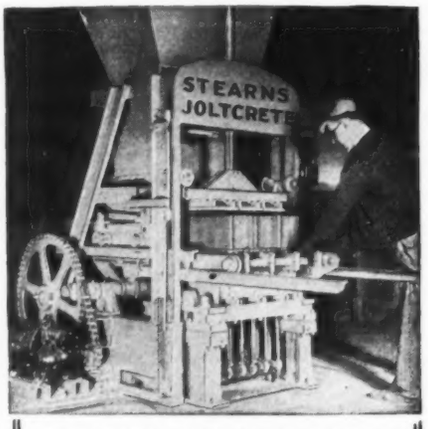

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Complete

EQUIPMENT AND ENGINEERING SERVICE

Equipment for all phases of manufacturing concrete cinder block and other lightweight aggregate units. Our engineering service for new plants and modernizing old ones will help you operate more economically.

Stearns Clipper Stripper Machines; Stearns Joltcrete Machines; Stearns Mixers; Cast Iron and Press Steel pallets. Straublox Oscillating Attachments, etc.

Repair parts for: Anchor, Stearns, Blystone Mixers and many others.

Anchor Concrete Mchy. Co.

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Move to New Quarters

DARDEN INDUSTRIES, INC., in accordance with its expansion program, has moved to larger quarters just north of Atlanta, Ga., along the main line of the Southern Railway. The main office, warehouse, and demonstration plant all will be on this same site, Roy Darden announced.

Mr. Darden also said that his company has been awarded a contract for distribution of F and A Precast Concrete Floor and Roof systems, developed by M. A. Arnold, Arnold Stone Co., Greensboro, N. C.; Otto Formigli, Formigli Brothers, Inc., Philadelphia, Penn.; and J. W. Warren, Southern Cast Stone Co., Knoxville, Tenn. The systems employ the use of lightweight precast inverted "T" joist and filler block, eliminating use of all forms in floor and ceiling construction.

It was further announced that Harold Shuptrine, Southern block plant operator, has been added to the field staff. The company's new address is P. O. Box 95, Northside Branch, Atlanta, Ga.

Concrete for Dam Project

GUY F. ATKINSON CO., Ostrander Construction Co. and J. A. Jones Construction Co., three companies awarded a $21,648,763 contract for construction of a major part of McNary Dam across the Columbia River at Umatilla, Ore., have organized as the McNary Dam Contractors of Plymouth, Wash., with George Atkinson, chairman; A. E. Holt, general manager, and R. J. Jenks, project manager in charge of work in the field at the damsite. First concrete for the project is to be poured this month, and pouring will end in January, 1950, under present contract. The firm has a contract with Inland Waterways for transportation of Permanente cement by barge to the damsite.

Group Insurance Program

ANCHOR CONCRETE PRODUCTS, INC., Buffalo, N. Y., has adopted a group insurance program for the benefit of its employees, Frederick W. Reinhold, president, has announced. The plan is underwritten by the Metropolitan Life Insurance Company, and is a joint undertaking between employer and employees, in which the employees contribute 25 percent, the amount to be deducted from their pay. The company will bear the balance of the cost.

Properties of Lightweight Aggregate Concretes

PHYSICAL PROPERTIES of several lightweight aggregate portland cement concretes made with burned shale or expanded slag have been investigated at the National Bureau of Standards and are recorded in Building Materials and Structures Report BMS112, published by the Bureau.

Dry Batched Concrete

(Continued from page 130)

and in Los Angeles, Calif., by Associated Products Corp., and in El Paso, Texas, by The Atlas Lime Co. Sound merchandising is absolutely essential to introduction of these new products so the policy of Sakrete Inc., is to grant licenses only to substantial companies who have capable marketing organizations. In each case the licensees are well on the way to building a sound and profitable business through the application of merchandising policies developed over many years by the parent organization. The result has been rapid development of sales in new territories by licensees who have from the beginning applied proven methods of planned merchandising. Franchises, in addition to territorial rights, cover the furnishing of the special equipment, gradings and formulae, technical assistance in plant design and layout, consulting services, and the furnishing of marketing plans, and periodic inspections by the parent company. All the effective sales arguments developed in the Cincinnati area with photostated testimonial letters from satisfied users and dealers are available to licensee companies. The trade name SAKRETE is used by each licensee and they all enjoy the low cost benefits of group advertising and buying.

Art Avril's idea of 14 years ago at first evaluation seemed to have limited possibilities but now it appears that there always has been a large potential in sales of very small quantities of concrete materials to individuals that, in many cases, might never have been purchased had this convenient product not been developed. His idea has created new markets for portland cement and aggregates.

Concrete Plant Sold

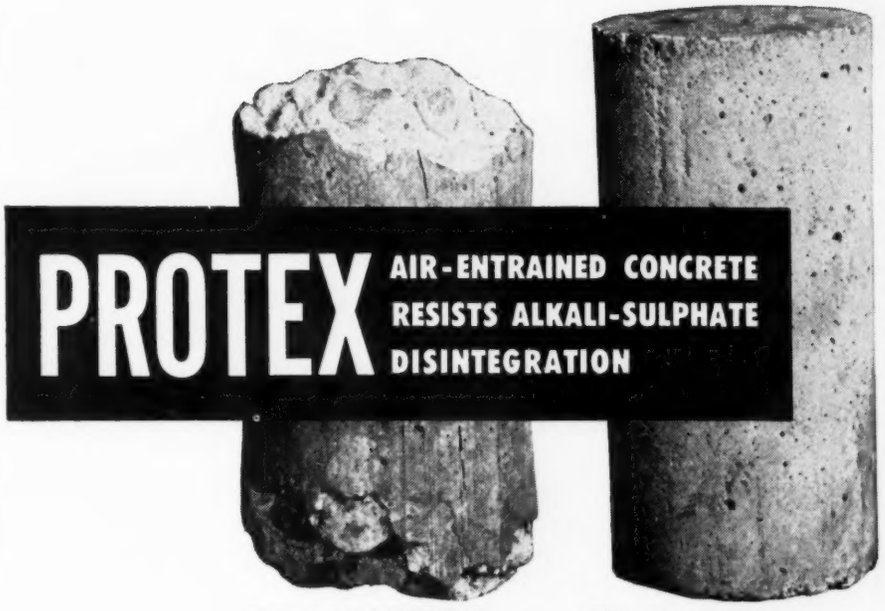
EDISON CEMENT WORKS, Mt. Gilead, Ohio, has been sold by Harold and Arnold Burnside to Earl Hottenroth and Anthony DiSanza. Arnold Burnside will remain in active charge of the business. The new owners plan to add a complete ready mixed concrete service, and to increase the present line of masonry and building supplies.

•

GREEN AND SAWYER CO., general contractors, Lima, Ohio, have purchased the H. V. Mertz concrete plant at Delphos. The company also operates ready-mixed concrete plants in Wapakoneta and St. Marys.

•

A. B. HARRIS has purchased the Lester McCarty Concrete Products Co., San Diego, Calif., from Lester McCarty, planning to continue business as usual under the name McCarty Concrete Products.



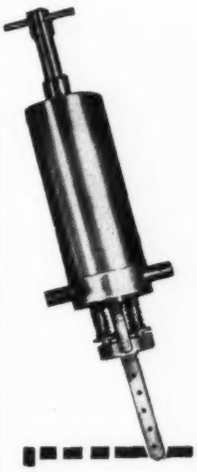
PROTEX AIR-ENTRAINED CONCRETE RESISTS ALKALI-SULPHATE DISINTEGRATION

Concrete WITHOUT Air-entrainment Silicious Aggregate

Type II cement. After 533 days in a 0.15 molar solution of sodium sulphate (Na_2SO_4). Weight loss 25%. Since 25% loss is considered equivalent to failure, the sulphate resistance test was discontinued.

Air-entrained Concrete—5.4% Air Silicious Aggregate

Type II cement. After 533 days in a 0.15 molar solution of sodium sulphate (Na_2SO_4). Weight loss—nil. This sample clearly shows how air-entrained concrete resists alkali-sulphate disintegration.



This test conclusively proves one of the many important advantages of PROTEX AEA. Also, PROTEX air-entrained concrete is more workable; dumps, spreads and finishes more easily—saves time—labor—money! Gives concrete resistance to freezing and thawing, improves resistance to scaling. Can be hauled without agitation, and in general protects the concrete against the usual causes of failure. It's tried! It's proven! Fully approved and widely used by U. S. Government agencies and A.G.C. Contractors. Specify PROTEX and get the best AEA.

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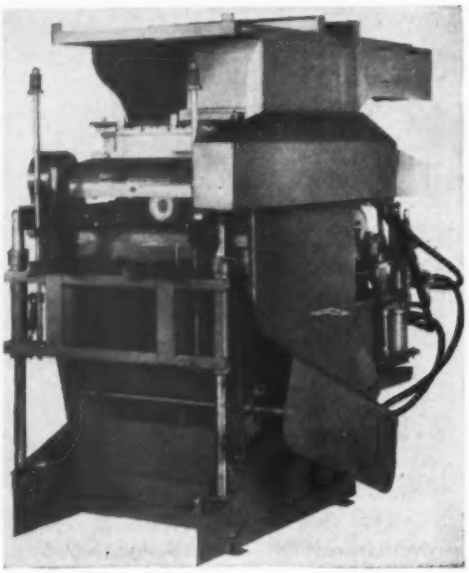
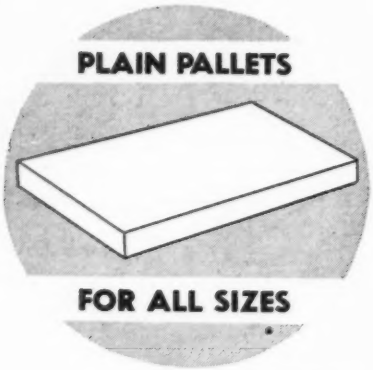


- The FMC 180 is the leader of a rugged line of FMC equipment for the production of top quality concrete block. Engineered throughout for fast full-time production and long wear.
- Three standard 8 by 8 by 16 inch blocks per minute produced by one man operation.

THE FMC 180



- One cent per block charge-off will pay for the FMC 180 in six months.
- FMC 180's are now in successful operation in 20 states and foreign countries.
- The FMC-180 is operated with PLAIN PALLETS. Any smooth surfaced material that will not flex or bend, under the load of the block, will do. The most commonly used pallets are obtained from steel plate (¼" thick), marine plywood (¾" thick) or ordinary 2"x10" lumber cut into 18" lengths.

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THE PLAIN PALLET VIBRATOR AT LOW COST!

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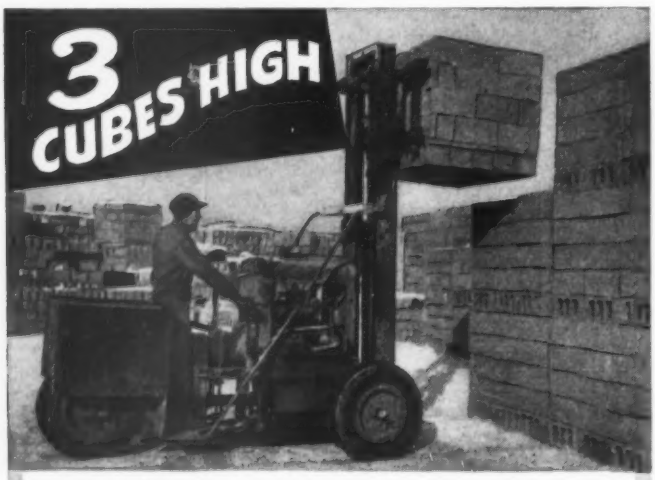

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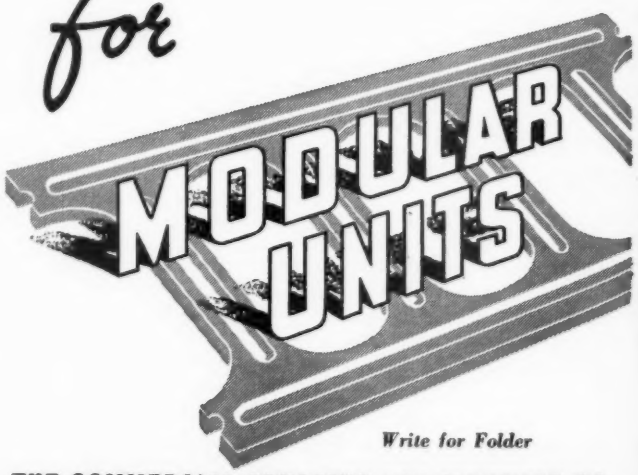

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